INTERNATIONAL FIELD YEAR FOR THE GREAT LAKES

IFYGL BULLETIN

NO.15

August 1975

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ONTARIO MINISTRY OF THE ENVIRONMENT

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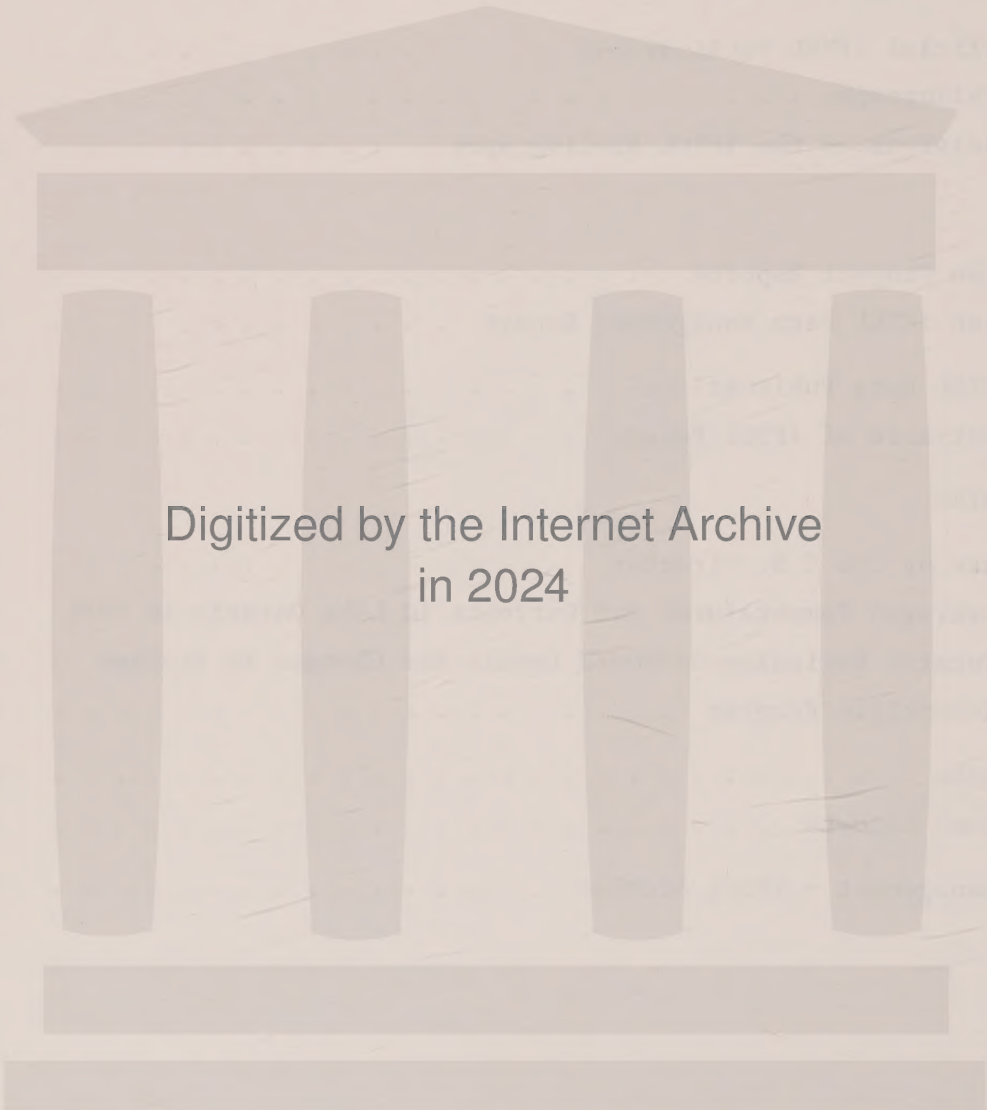
Published by the National Oceanic and Atmospheric Administration,
U.S. Department of Commerce, Rockville, Md. 20852

CONTENTS



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A joint Canadian-United States list of publications related to IFYGL was included in IFYGL Bulletin No. 13, and will appear, cumulatively, in all subsequent issues. Additions will be identified as such in each Bulletin. Any questions, comments, or additions to the bibliography should be addressed to one of the IFYGL Coordinators as follows:

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IFYGL Technical Plan, Volumes 1-4 (series complete, 1971)[1, 2]

IFYGL Canadian Projects, March 1972 (series complete, 1973)[2]

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[1] Available in the United States from the
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Murthy, C. R., "Horizontal Diffusion Characteristics in Lake Ontario," Canada Centre for Inland Waters, Burlington, Ontario.

Ploscya, J. A., "Seasonal Distribution of Chlorophyll A in the Near-Shore Zone of Southwestern Lake Ontario (IFYGL)," State University College at Buffalo, New York.

Polcyn, F. C., and T. W. Wagner, "Production of Hydrological Computer Maps of the Lake Ontario Basin," Environmental Research Institute of Michigan, Ann Arbor, Michigan.

Sullivan, J.[1], E. M. Rasmusson[1], and H. L. Ferguson[2], "Atmospheric Water Balance Over Lake Ontario," [1]Center for Experiment Design and Data Analysis, Environmental Data Service, National Oceanic and Atmospheric Administration, Washington, D.C.; [2]Canada Centre for Inland Waters, Burlington, Ontario.

Thomann, R. V., and R. P. Winfield, "Estimated Response of Lake Ontario Phytoplankton Biomass to Nutrient Reduction," Manhattan College, Bronx, New York.

Thomas, N. A., "Lake Ontario Sediment Oxygen Demand Rates," EPA, Grosse Ile, Michigan.

Watson, N. H. F., and D. J. Williams, "Design and Operation of a Pilot Surveillance Program for Lake Ontario," Canada Centre for Inland Waters, Burlington, Ontario.

CANADA

Editor	W.L. Ranahan
Typist	(Miss) L.S. Tozer

CANADIAN PROJECT REPORTS

Notes: 1. Projects are numbered consecutively.

2. The letters following the number indicate which panel has prime responsibility for the project.

BC - Biology-Chemistry
BL - Boundary Layer
EB - Energy Budget
ME - Lake Meteorology and Evaporation
TW - Terrestrial Water Balance
WM - Water Movement
F - Feasibility

Project

1F: *Remote Sensing*

Principal Investigator: K.P.B. Thompson - CCIW

The project is complete. Three scientific papers have resulted from this project, and are listed in the IFYGL Bibliography. Two were authored by the Principal Investigator and a third is listed under R.P. Bukata.

3WM: *Statistical Prediction of Lake Currents*

Principal Investigator: H.S. Weiler - CCIW

This project has been cancelled and there will be no material submitted to the IFYGL Data Bank.

4WM: Included in Project 45WM: *Lake Current Measurements*

5BL: *Direct Measurement of Energy Fluxes*

Principal Investigator: M. Donelan - CCIW

A number of papers have resulted from this project to date, and two have been accepted for publication in the Proceedings of the 17th Conference on Great Lakes Research (IAGLR). They are entitled "Determination of the Aerodynamic Drag Coefficient from Wind Set-up" and "Generalized Profiles of Wind Speed, Temperature, and Humidity" and are listed in the Bibliography under the Principal Investigator.

A further paper was presented at the 18th Conference on Great Lakes Research (IAGLR) in May, entitled "The Influence of Wind Generated Waves on the Wind Profile" by M.A. Donelan. The abstract of this paper is included in this Bulletin following "Canadian Project Reports".

8EB: *Shore Gauging Stations of Water Temperature*

Principal Investigator: D.G. Robertson - CCIW

A report on the results of the observations will be incorporate with the final report on Project 42EB by F.M. Boyce.

9EB: Included in Project 42EB.

11TW: *Monthly Water Balance of the Lake Ontario Basin*

Principal Investigator: D.F. Witherspoon - IWD, Cornwall

The calculations for this project are complete. The final report will be in the Terrestrial Water Balance Panel Report. The following is a list of scientific papers that resulted from this IFYGL project:

Witherspoon, D.F. "A Hydrologic Model of the Local Lake Ontario Basin", Technical Bulletin No. 31. Inland Waters Branch, EM&R, Ottawa, Canada, 1970.

Witherspoon, D.F. "Storage in the Water Balance of the Lake Ontario Basin", Proceedings, World Water Balance Symposium, Reading, England, 1970.

Witherspoon, D.F. "Operational Uses of Regional Water Balance in the Lake Ontario Basin", to be presented at the Canadian Hydrology Symposium, Winnipeg, August, 1975.

12TW: *Monthly Water Balance of Lake Ontario*

Principal Investigator: D.F. Witherspoon - IWD, Cornwall

This project is essentially complete except for the writing of the final report of the Terrestrial Water Balance Panel. The outline of the report is before the Joint Management Team for approval. Final results await radar precipitation final values for the lake. The following papers have resulted from this project:

Witherspoon, D.F. "General Water Balance of Lake Ontario and Its Local Land Basin", International Geographical Congress, Montreal, August, 1972.

DeCooke, B.G. and D.F. Witherspoon. "Preliminary Lake Ontario Water Balance During IFYGL", Proceedings, 16th Conference, Great Lakes Research (IAGLR), Sawmill Creek, Ohio, April 1973.

DeCooke, B.G. and D.F. Witherspoon. "An Estimate of the Water Balance of Lake Ontario During IFYGL", Proceedings, IFYGL Symposium, 55th Annual Meeting, American Geophysical Union, April 8-12, 1974.

13TW: *Groundwater Flow into Lake Ontario*

Principal Investigator: D.H. Lennox - IWD

This project is complete. Two publications have resulted under the authorship of C.J. Haefeli and are listed in the IFYGL Bibliography.

14TW: *Hydrology of Lake Ontario*

Principal Investigator: E.A. MacDonald - IWD

The data have been submitted to the IFYGL Data Bank and the project is now complete.

15BL: *Space Spectra in the Free Atmosphere*

Principal Investigators: G.A. McBean and E.G. Morrissey - AES

Two papers have resulted from this project to date: "On the Spectral Structure of Turbulence in the Atmospheric Ekman Layer" by B.R. Kerman and "Reduction and Preliminary Analysis of Mesoscale Meteorological Data provided by NAE Low Level Research Flights in Connection with the IFYGL Program Technical Report", by D.W.B. Prentice.

16ME: *Airborne Radiation Thermometer Survey*

Principal Investigator: J.G. Irbe - AES

This project is complete. A complete report was included in IFYGL Bulletin No. 9.

18ME: *Climatological Network*

Principal Investigator: J.A.W. McCulloch - AES

This project is complete.

19ME: Included in Project 66ME.

20ME: *Bedford Tower Program*

Principal Investigator: J.A.W. McCulloch - AES

A software company was commissioned to write the necessary program to convert from sensor output to scientific units and to apply calibration corrections. The program has been written and production runs will begin about mid-July.

21ME: *Canadian Shoreline Network*

Principal Investigator: J.A.W. McCulloch - AES

Preliminary tapes for the first six months for all six stations have been submitted to the Data Bank, with data for the remaining six months being available by the end of September.

22ME: *Synoptic Studies*

Principal Investigators: J.A.W. McCulloch and M.S. Webb - AES

Little work will be done until data are available from Canadian Shoreline stations, and U.S. towers, buoys, and shoreline stations.

23ME: *Radar Precipitation*

Principal Investigator: D.M. Pollock - AES

The Canadian IFYGL Radar data for April through November 1972 have been digitized, quality-controlled, and archived on magnetic tape. The precipitation gauge data were previously analysed and programs for intercomparison of the gauge and radar estimates of precipitation are now operating. Adjustment of the radar precipitation field using the gauge information has been carried out for selected storms.

24ME: *Climatological Studies*

Principal Investigator: D.W. Phillips - AES

The IFYGL Data Bank has been provided with a complete set of six-hourly weather maps on microfilm, covering the IFYGL Data period. The paper "Climatological Weather Highlights During IFYGL" was accepted for publication in the Proceedings, 17th Conference on Great Lakes Research (IAGLR). The series "IFYGL Weather Data" for the Field Year is in the process of being published in an AES Technical Memorandum.

25ME: *Lake Ontario Evaporation by Mass Transfer*

Principal Investigator: J.G. Irbe - AES

Monthly and daily evaporation estimates have been prepared by the mass transfer method, and have been submitted to the Evaporation Synthesis Group.

26ME: *Wind and Humidity Ratios*

Principal Investigator: J.G. Irbe - AES

No further progress to report.

27ME: *Island Precipitation Network*

Principal Investigator: J.A.W. McCulloch - AES

The data have been published in Supplementary Precipitation, Vol. 4, No's. 2 and 3.

28BL: *Momentum, Heat, and Moisture Transfer*

Principal Investigators: G.A. McBean, H.C. Martin, R.J. Polavarapu - AES

Data analysis is complete and a comprehensive data report has been submitted to the IFYGL Data Bank. The Data Report was presented in Bulletin No. 13.

29BL: *Space and Time Spectra*

Principal Investigators: F.B. Muller and C.D. Holtz - AES

Data for the synoptic network have been provided to the IFYGL Data Bank. Additional data from the meso-scale network are held by the Principal Investigators.

30F: *CCGS Porte Dauphine - IFYGL Operations*

Principal Investigator: G.K. Rodgers - CCIW

Completed.

32EB: *Thermal Bar Study*

Principal Investigator: G.K. Rodgers - CCIW

Further progress is not likely until the results of the study regarding the heat content change of Lake Ontario are made available.

34WM: *Circulation Near Toronto*

Principal Investigator: G.K. Rodgers - CCIW

The final report is in preparation.

36EB: *Electronic Bathythermograph*

Principal Investigator: G.K. Rodgers - CCIW

This project is complete.

38TW: *Groundwater*

Principal Investigator: R.C. Ostry - OME

Several papers resulting from this project are listed in the IFYGL Bibliography under the Principal Investigator and S.N. Singer. The most recent addition is the Water Resources Report 5d by S.N. Singer, entitled "A Hydrogiological Study Along the North Shore of Lake Ontario in the Bowmanville-Newcastle Area",

40WM: *Coastal Chain Study*

Principal Investigator: G.T. Csanady - University of Waterloo

Completed.

42EB: *Heat Storage of Lake Ontario*

Principal Investigator: F.M. Boyce - CCIW

Final report on this project will be completed by July, 1975.

43EB: *Internal Wave Measurements*

Principal Investigator: F.M. Boyce - CCIW

The final data report will be completed by August, 1975.

44BL: *Analysis of Energy Fluxes*

Principal Investigator: F.C. Elder - CCIW

This project is complete. The paper "Preliminary Energy Balance of Lake Ontario for the period May through November 1972" was accepted for publication in the Proceedings, 17th Conference on Great Lakes Research (IAGLR).

45WM: *Lake Current Measurements*

Principal Investigator: E.B. Bennett - CCIW

There is no further progress to report beyond that outlined in the paper "IFYGL Water Movement Program" co-authored by E.B. Bennett and J.H. Saylor. This paper was published in Proceedings, IFYGL Symposium, 55th Annual Meeting of the American Geophysical Union, Washington, D.C., April, 1974.

46TW: *St. Lawrence-Niagara River Measuring Program*

Principal Investigator: M.H. Quast - IWD

This project is complete. The data report has been submitted.

47TW: *Computer Modelling*

Principal Investigator: L.E. Jones - University of Toronto

No report available.

49TW: *Snow Stratigraphy and Distribution*

Principal Investigator: W.P. Adams - Trent University

No report available.

54BC: *Groundwater Supply Near Kingston*

Principal Investigator: W.A. Gorman - Queen's University

One paper has resulted from this project which is now complete. The paper entitled "Geochemistry of Deadman Bay Near Kingston, Ont." was prepared by L.M. Johnston as a M. Sc. Thesis.

55EB: Included in 32EB.

62ME: *Evaporation Synthesis*

Principal Investigator: J.A.W. McCulloch - AES

A meeting of the Evaporation Synthesis Group was held in November 1974, in Windsor, Ontario. Preliminary results in the various evaporation projects were presented and the future activities of the synthesis group were discussed. Indications were that little progress could be made by the group for another year, until some of the evaporation studies were nearer completion.

63EB: *Airborne Water Balance Study*

Principal Investigator: T.B. Kilpatrick - AES

This project is complete. A detailed report of the project's activities was included in Bulletin No. 9.

64ME: *Atmospheric Water Balance Study*

Principal Investigator: H.L. Ferguson - AES

A comprehensive report on this project was included in Bulletin No. 12. Three papers have resulted to date: "The Atmospheric Budgets Program of IFYGL" by E.M. Rasmusson, H.L. Ferguson, J. Sullivan and G. den Hartog; and "A Spectral Investigation of Horizontal Moisture Flux in the Troposphere" by A.D.J. O'Neill and H.L. Ferguson. A third paper entitled "Atmospheric Water Balance Over Lake Ontario" by J. Sullivan, E.M. Rasmusson and H.L. Ferguson, was presented at the 18th Conference on Great Lakes Research in May. The abstract follows "Canadian Project Reports" in this Bulletin.

65ME: *Special Shoreline Evaporation Pan Network*

Principal Investigator: J.A.W. McCulloch - AES

The data collection is complete, and the data are now awaiting processing by the Office of Hydrology, U.S. National Weather Service, NOAA.

66ME: *Basin Evapotranspiration*

Principal Investigator: H.L. Ferguson - AES

This project is now complete. A status report was presented in Bulletin No. 12, the abstract of a paper " Monthly Evapotranspiration Estimates for the Canadian Land Portion of the Lake Ontario Basin During IFYGL" by H.L. Ferguson and W.D. Hogg. This paper has been accepted for publication in the Proceedings, 17th Conference for Great Lakes Research.

67ME: *Surface Water Temperature Distribution*

Principal Investigator: M.S. Webb - AES

The following paper from this project will appear in the Proceedings of the 17th Conference on Great Lakes Research (IAGLR) - "Mean Monthly Temperatures of Lake Ontario During the IFYGL" by M.S. Webb.

68F: *CCIW Supporting Resources*

Principal Investigator: P.G. Sly - CCIW

Continues.

69TW: *Pleistocene Mapping*

Principal Investigator: E.P. Henderson - GSC

No report available.

70WM: *Ground Truth for Remote Sensing*

Principal Investigator: A. Falconer - Univ. of Guelph

No report available. See Bulletin No. 10 for last report.

71EB: *Canadian Radiation Network*

Principal Investigator: J.A.W. McCulloch - AES

See project 80EB.

72EB: *Floating Ice Research*

Principal Investigator: R.O. Ramseier - DOE, Ice

Two papers have resulted from this project; "Studies on the Extension of Winter Navigation on the St. Lawrence River" by R.O. Ramseier and D. Dickins, and "Navigation Season Extension Studies, Gulf of St. Lawrence to Great Lakes, Winter 1972-73", by D. Dickins.

73EB: *Terrestrial Heat Flow*

Principal Investigator: A. Judge - EM&R

Last reported in Bulletin No. 10.

74TW: *Water Level Network*

Principal Investigator: G.C. Dohler

An extensive report was included in Bulletin No. 12. This project has been terminated.

75BL: *Wind and Temperature Fluctuations*

Principal Investigators: S.D. Smith and E.C. Banks - Bedford Institute

This project was completed with the publication of: "Eddy Flux Measurements Over Lake Ontario" by S.D. Smith, Boundary Layer Meteorology, Vol. 6, pp. 235-255. Some additional comparison work may be undertaken when Niagara Bar data from Donelan (CCIW) and McBean (AES) are available.

76WM: *Surface Wave Studies*

Principal Investigator: G.L. Holland - MSD

This project is complete with all data archived at the Canadian IFYGL Data Bank.

78TW: *Basin Water Balance*

Principal Investigator: M. Sanderson - University of Windsor

This project has been cancelled.

79F: *Bathymetric Surveys of Lake Ontario*

Principal Investigator: T.D.W. McCulloch - CCIW

This project is complete.

80EB: *IFYGL Radiation Balance Program*

Principal Investigator: J.A. Davies - McMaster University

This project was completed with the publication of "Canadian Radiation Measurements and Surface Radiation Balance Estimates for Lake Ontario During IFYGL" by J.A. Davies and W.M. Schertzer. All data measurements have been submitted to the Data Bank.

81BC: *Materials Balance - Lake Ontario*

Principal Investigator: S. Salbach - OME

A comprehensive report was included in Bulletin No. 12.

82BC: *Lake Ontario Zooplankton Migration*

Principal Investigator: J.C. Roff - University of Guelph

Last reported in Bulletin No. 9. One paper, "Energetics of Vertical Migration in Mysis Loven 1862" by J.B. Foulds, has resulted from this project.

83BC: *Cooperative Studies of Fish Stocks*

Principal Investigator: W.J. Christie - OMNR

Last reported in Bulletin No. 12.

84BC: *Cladophora Growth*

Principal Investigator: G.E. Owen - OME

Data gathered during the Field Year are in the form of imagery. Data extraction from the imagery has been progressing slowly. All data and results will be presented in the final report on this project to be completed by late summer 1975.

85BC: *Nutrient Cycles - Lake Ontario*

Principal Investigator: A.S. Fraser - CCIW

A paper dealing with this project is in the final phase of preparation.

87EB: Included in Project 42EB.

89WM: *Turbulent Diffusion Studies*

Principal Investigator: C.R. Murthy - CCIW

A number of scientific papers resulted from this project and are listed in Bulletin 13, and included in the IFYGL Bibliography. For a complete project report, see Bulletin No. 11. A recent paper "Horizontal Diffusion Characteristics in Lake Ontario" was presented at the 18th Conference on Great Lakes Research in May, authored by C.R. Murthy. The abstract of this paper is presented in this Bulletin following "Canadian Project Reports".

90WM: Included in Project 89WM.

94: *Data Retransmission by Satellite*

Principal Investigator: H. MacPhail - CCIW

The final report on this project is completed, and is entitled "Data Retransmission via satellite, Field Year 1972" authored by the Principal Investigator.

95WM: *Hydrodynamic Modelling*

Principal Investigator: T.J. Simons - CCIW

For a complete report see Bulletin No. 12. There were five scientific papers published from this project and they are listed in the Bibliography under the name of the Principal Investigator. This project is now complete.

96WM: Included in Project 45WM.

97BL: *Meteorological Buoy Measurements*

Principal Investigator: F.C. Elder - CCIW

This project is complete and all data have been submitted to the Data Bank. One paper entitled "The Evaluation of the Measurement Accuracy of the CCIW IFYGL Meteorological Buoy" authored by M.A. Donelan and F.C. Elder was presented at the 18th Conference on the Great Lakes. The abstract of this paper is presented following "Canadian Project Reports" in this Bulletin.

98BC: *Lake Ontario Cross Section Study*

Principal Investigator: M. Munawar - CCIW

A paper resulting from this project was presented at the 17th Conference on Great Lakes Research (IAGLR) 1974, entitled "Phytoplankton Biomass, Its Species Composition and Primary Production at a Nearshore and Midlake Station of Lake Ontario During IFYGL", by M. Munawar, P. Stadelmann and I.F. Munawar.

101BC: *Lake Ontario Primary Production Study*

Principal Investigators: M. Munawar and J.E. Moore

The project has been completed. The last report was given in Bulletin No. 12.

102BC: *Lake Ontario Diel Pigment Variation*

Principal Investigators: W. Glooschenko and M. Munawar - CCIW

This project is complete. The abstract of the final paper was included in Bulletin No. 12.

103BC: *Pesticide Concentration in Bird's Eggs*

Principal Investigator: M. Gilbertson - CWS

The project is continuing. Four papers have resulted to date and are listed in the IFYGL Bibliography under the Principal Investigator.

104BC: *Rain Quality Monitoring*

Principal Investigator: M. Shiomi - CCIW

No report available. See Bulletin No. 9 for last complete report.

107BL: *Air Pollution Sinks*

Principal Investigator: D.M. Whelpdale - AES

This project is complete. Two publications have resulted: "Sulphur Dioxide Removal by Turbulent Transfer Over Grass, Snow and Water Surfaces" by D.M. Whelpdale and R.W. Shaw; and "Sulphate

Deposition by Precipitation into Lake Ontario" by R.W. Shaw and D.M. Whelpdale. Both are listed in the IFYGL Bibliography.

108BL: *Lake Level Transfer*

Principal Investigator: G.C. Dohler - MSD

This project has been terminated with several papers to be published.

109WM: *Upwelling Study*

Principal Investigator: G.K. Rodgers - CCIW

The Final Report is in preparation.

110WM: *Hydro Intake Study*

Principal Investigator: A. Arajs - OH

This project was completed with the paper "Nearshore Currents and Water Temperatures Along the North Shore of Lake Ontario Between Pickering and Cobourg" by A.A. Arajs and R. Faroqui.

111WM: *Lakeview Dispersion Study*

Principal Investigator: M.D. Palmer - OME

This project is complete, and all the data have been submitted to the IFYGL Data Bank.

112BC: *Threespine Stickleback*

Principal Investigator: E.T. Garside - Dalhousie University

No report available. Last reported in Bulletin No. 9.

114WM: Included in Project 89WM.

115WM: *Wave Climatology*

Principal Investigator: H.K. Cho - CCIW

The data have been submitted to the Data Bank.

116TW: *Airborne Gamma Ray Snow Survey*

Principal Investigator: H.S. Loijens - IWD, Glaciology

The project was last reported in Bulletin No. 9. The project has been terminated; however, research in the use of natural gamma radiation for snow-water equivalent and soil moisture determination is continuing.

117ME: *APT Photographs*

Principal Investigator: J.A.W. McCulloch - AES

This project is now completed. The microfilm is on file at the IFYGL Data Bank.

118: *Canadian IFYGL Data Bank*

Principal Investigator: J. Byron - CCIW

Cat. No. 3-118-039	"An Introduction to the IFYGL". T.L. Richards
Cat. No. 3-118-040	IFYGL Bulletin No. 13

CANADIAN IFYGL DATA MANAGEMENT REPORT

IFYGL Data Publications

The U.S. and Canadian IFYGL Data Managers are planning a final Data Catalogue which will list all IFYGL data collected and archived in the Data Banks.

It is hoped such a catalogue could be produced early in 1976 which would cover data submissions to the end of 1975. All Principal Investigators are asked to ensure their data are made available to the Canadian IFYGL Data Bank by the end of 1975.

In the meantime, a further interim catalogue of Canadian IFYGL Data Submissions will be produced this summer. It will list all Canadian data submissions to the end of July, really a compilation of all Canadian IFYGL Data Bank Monthly Newsletters. Distribution will be through the regular Newsletter Mailing List, but copies could be obtained after July 31, 1975 from:

J.W. Byron
Canadian IFYGL Data Bank Manager
Canada Centre for Inland Waters
P.O. Box 5050
Burlington, Ontario.

Canadian Editor's Note: A number of IFYGL papers were presented at the 18th Conference on Great Lakes Research (IAGLR) in May 1975 at Albany, N.Y. The abstracts of such papers with at least one Canadian author are included in this Bulletin on the following few pages.

THE INFLUENCE OF WIND GENERATED WAVES ON THE WIND PROFILE

M.A. Donelan
(IFYGL Project 5BL)

Certain ten minute averaged wind and temperature profiles in the lowest 12 metres over Lake Ontario strikingly demonstrate the ability of wind-generated waves to return momentum to the atmosphere - direct field evidence for the so-called 'wave-driven wind'. Although the effect is most obvious when the dominant waves precede the wind, more subtle effects suggest that there is a continual appreciable interchange of momentum between waves and wind: the normalized temperature profile behaves in much the same way as it does over land, i.e., its curvature on a logarithmic height scale has the same sign as the airwater temperature difference; whereas the curvature of the wind profile is generally positive whatever the sign of the stability parameter. The explanation advanced is that longer waves, produced by non-linear interactions among the wind generated waves, return momentum to the air stream just below the matched layer for the longer waves. Thus very near to the surface the boundary layer loses momentum to the wind generated waves while higher up it gains some momentum from the longer waves, thereby increasing the curvature of the wind profile. This idea depends on a difference in form of the coupling coefficient between wind and waves depending on the sign of the difference in local wind speed and wave phase velocity. An hypothesis is advanced which yields a suitable form for the coupling coefficient and which explains the existence of the ubiquitous steep forward face in the spectrum of wind generated waves.

ATMOSPHERIC WATER BALANCE OVER LAKE ONTARIO - OCT. 30, NOV. 14, 1972

J. Sullivan, E.M. Rasmusson and H.L. Ferguson
(IFYGL Project 64ME)

Estimates of E-P, the difference between evaporation and precipitation, are obtained for Lake Ontario for the period Oct. 30-Nov. 14, 1972 from atmospheric water balance computations using data from the IFYGL network of 6 rawinsonde stations. Additional diagnostic and kinematic quantities useful in the evaluation of the results have also been computed. The analysis technique, in which time-height variations are decomposed into time and pressure components, is described. Computed values of divergence are on the order 10^{-5} sec^{-1}. Values of relative vorticity are generally 2-3 times larger. Variations in these quantities, as depicted on time-height sections, can often be directly related to observed synoptic features. Examination of balance residuals indicate that the vertical subgrid scale flux of water vapor can generally be neglected above 500 mb of the atmosphere. Computed

daily averaged values of E-P, which generally range between +1.0 cm. to -1.5 cm., are discussed in terms of the synoptic situation. Computed values of evaporation derived from preliminary estimates of lake averaged precipitation are presented and discussed.

HORIZONTAL DIFFUSION CHARACTERISTICS IN LAKE ONTARIO

C.R. Murthy
(IFYGL Project 89WM)

Experimental data on the diffusion of fluorescent dye patches were obtained in the epilimnion, thermocline and hypolimnion regions of Lake Ontario during IFYGL. In each experiment, a slug of water-soluble rhodamine dye solution was introduced at appropriate depths. The growth of the diffusing dye patch was followed up to 80 hours after dye release, using fluorometric sampling. The data covered a length scale of 100 m to 15 km and the corresponding horizontal eddy diffusivities varied from 10^2 to 10^6 cm^2 sec^{-1}. Several horizontal diffusion characteristics are constructed based on a simple theoretical model. The experimental results indicate that the eddy diffusivity grows faster than Fickian and somewhat slower than "inertial sub-range". Although the diffusion characteristics cannot be justified entirely from theoretical arguments, they could be viewed as purely statistical since they have been constructed from experimental data obtained in widely varying environmental conditions and provide useful guide-lines for modelling practical diffusion problems.

EVALUATION OF THE MEASUREMENT ACCURACY OF THE CCIW IFYGL METEOROLOGICAL BUOY

M.A. Donelan and F.C. Elder
(IFYGL Project 97BL)

A moored buoy meteorological measurement system employed by the Canada Centre for Inland Waters (CCIW) during the International Field Year on the Great Lakes (IFYGL) was deployed within 1 km of a fixed tower installation off Niagara in Lake Ontario. Several months of coincident observational data were obtained. Detailed and carefully monitored observations from the fixed tower provide excellent data from which to evaluate the accuracy of the buoy-mounted system.

After eliminating air trajectories having short fetches, about 400 hours of comparison data were available in the form of hourly averages from each system. Data were examined in the form of error functions assuming the tower system to be correct. Results obtained are:

Variable	Mean Error	Standard Duration
Air Temperature	0.15C	0.36C
Water Temperature	0.04C	0.46C
Relative Humidity	-4.8%	6.2%
Wind Speed	14.5 cm s^{-1}	36.0 cm s^{-1}
Wind Direction	7.5°	29.9°

The results are in close agreement with prior evaluations of the CCIW system: relative humidity and wind direction showing substantial errors. As a result, applications employing wind speed can reduce errors by applying a scaler mean wind value where possible and using separate direction averages. In this way, the large deviation in direction errors will be reduced by averaging.

DESIGN AND OPERATION OF A PILOT SURVEILLANCE PROGRAM FOR LAKE ONTARIO

N.H.F. Watson and D.J. Williams

Note: This paper is not part of an IFYGL Project, but does refer to IFYGL data.

A pilot surveillance program for Lake Ontario was designed and run in 1974, to meet the requirements of the IJC for information on areas of improving or deteriorating water quality, general lakewide conditions and responses to the impact of management procedures. The program included only those key parameters reflecting the impact of eutrophication and those necessary for their interpretation. Station pattern and number was selected to provide coverage of problem areas and reduce variance on a regional rather than a lakewide basis. Cruise frequency varied to allow for an evaluation of temporal coverage. Chlorophyll *a* and other biomass parameters, dissolved oxygen and total phosphorus were the chief impact parameters measured. Profiles of temperature and beam attenuation were made to provide interpretative information. Corrected chlorophyll values in excess of 10 mg/m^3 (considered the upper limit of the mesotrophic range) at many inshore locations, especially prior to, and after stratification and some dissolved oxygen values considerably less than 80% saturation (minimum value noted on Canadian IFYGL cruises) indicate that eutrophication effects are present in specific areas of the lake. Conductivity values averaging 330 μmhos increased 4% since 1967. A discussion of the design rationale is presented in the hope that it will prove useful as part of a more general surveillance program for the Great Lakes.

UNITED STATES

Editors — Fred Jenkins and May Laughrun

Typist — Ann Hanks

COMMENTS BY THE U.S. DIRECTOR

This issue of the Bulletin covers primarily work done between January 1 and March 31, 1975, with some activities in April and May included.

Management of the data from the major IFYGL acquisition systems has been completed by the Center for Experiment Design and Data Analysis (CEDDA). This major phase of the IFYGL program has consisted of handling, processing, editing, and reformatting a voluminous data collection, and we are grateful to Dr. Holland and his staff for a job well done.

The IFYGL Archive is nearing completion as indicated in figure 1, and the responsibility for its management now lies with the National Climatic Center (NCC) at Asheville, N.C. An updated list of the contents of the Archive is given in the Data Management section of the Bulletin to keep readers abreast of changes and additions as individual tasks are completed.

Planning continues for the summary scientific reports covering the work of the IFYGL panels. The cochairmen of the Joint Management Team will meet in the fall of this year to draw up final plans for these reports. Plans are also underway for a final symposium at the end of 1977 to serve as a forum for critique of the Field Year and for the discussion of its impact on future programs. As stated in Bulletin No. 14, comments on any aspects of IFYGL will be appreciated by the U.S. IFYGL Project Office.

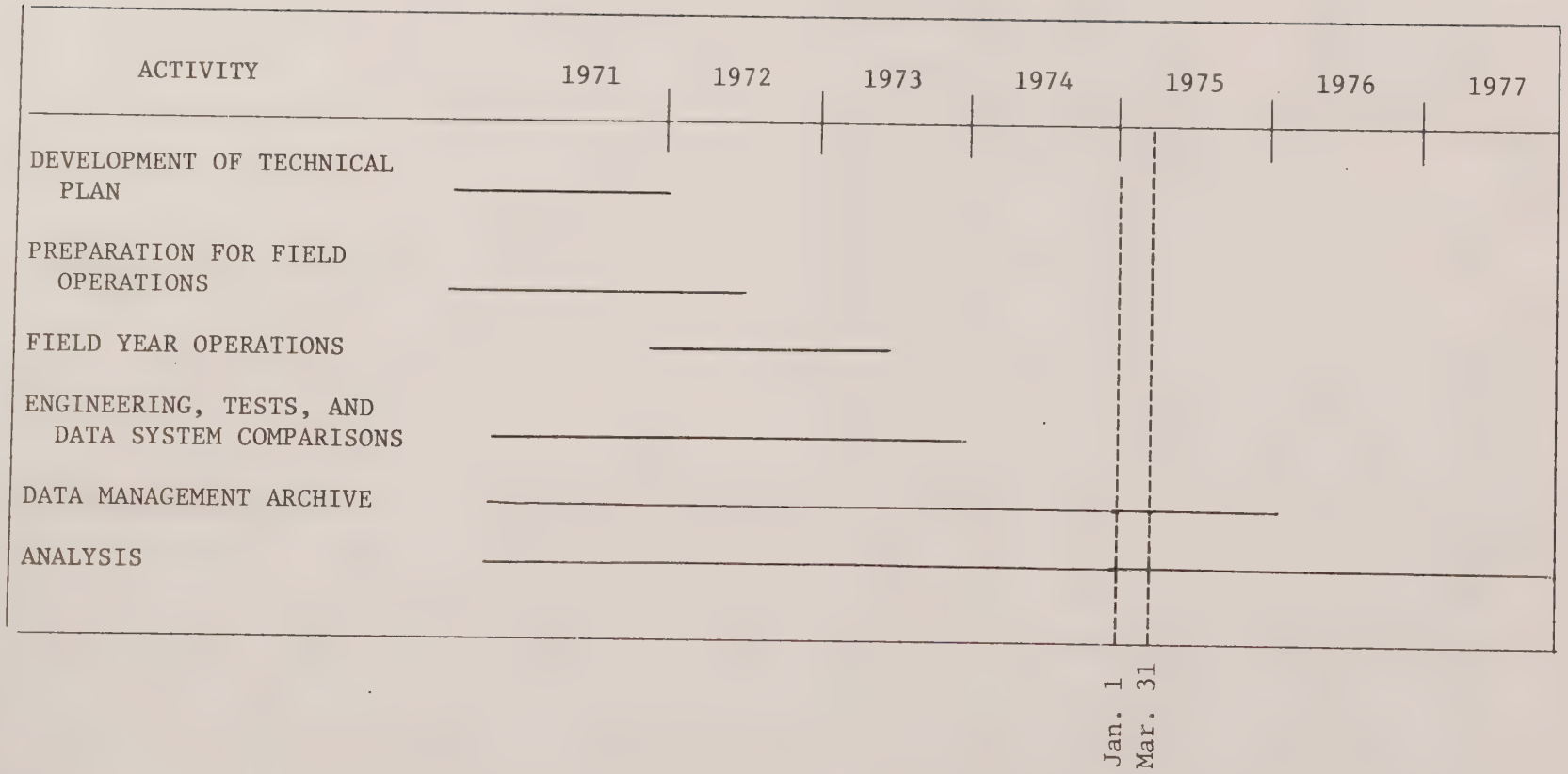

Figure 1.--U.S. IFYGL schedule.

LAKE-AVERAGED TEMPERATURES AND CURRENTS IN LAKE ONTARIO IN 1972

R. L. Pickett

Great Lakes Environmental Research Laboratory
Ann Arbor, Michigan

Data

During 1972 some 30 million observations of temperatures and currents were obtained from 20 United States and Canadian buoys and towers in Lake Ontario. To gather insight into long-term, large-scale properties of the lake, the data were edited and then averaged in both space and time.

Table 1 shows temperatures horizontally averaged over the whole lake, and temporally averaged over each month the network was in operation. The temperature sensors were designed to record within 0.2°C. Table 2 shows the same type of data for wind and current speeds. The wind sensors were designed to be within 100 cm s^{-1}, and the current sensors within 2.5 cm s^{-1}. Vertical changes of a degree or so in temperature and of a few centimeters per second in current speed are not considered significant and are attributable to long-term operational problems of drift, transducer fouling, and the like.

Results

Air temperatures climb rapidly in spring and average 5°C higher than the lake surface by May. Below the surface the lake is essentially isothermal and at maximum density. By June and July the lake surface is warming faster than the air, and a thermocline is forming and strengthening. By August the lake surface has caught up with the air temperature, and both peak at 19°C. The air temperature starts dropping, while the lake temperature lags. The thermocline begins to weaken and dissipate. By November the 4°C air temperature is producing strong horizontal temperature gradients across the lake and sinking water. As a result, the lake-averaged temperatures show apparent instabilities everywhere.

Just as a relationship between air temperature and water temperature is evident, so is a relationship between wind speed and current speed. However the wind-current relationship is blurred somewhat by the dependency of their coupling on the air-lake temperature difference. Note, for example, that although June tends to have higher mean winds, August tends to have higher currents. This is partly caused by the 3°C air-lake surface temperature difference in June and the 0°C difference in August.

In May the isothermal lake seems to have a barotropic flow of 3 cm s^{-1}. As the season progresses and wind and current speeds pick up, vertical shear develops. (At -30 m currents seem consistently low, probably because of too low readings from one or more meters.) As summer moves to autumn, wind speeds increase, air-lake temperature differences go negative, and currents

respond by increasing in speed and shear. In November surface cooling agai seems to produce strange effects, but these are partly the result of the change in sampling as meters were being removed before ice set in.

Table 1.--Lake Ontario monthly mean temperatures for 1972 (°C)

Level (m)	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
				Air temperature				
3	3	9	12	19	19	17	10	4
				Water temperature				
0	2	4	9	18	19	18	13	9
- 5		4	7	17	19	18	13	9
- 10		4	6	11	15	17	13	9
- 15		4	6	9	13	15	11	8
- 20			5	7	10	12	12	10
- 25		4	5	6	8	9	11	9
- 30		3	4	5	6	7	9	10
- 35		4	4	5	6	6	8	9
- 40			4	5	5	5	8	12
- 50		3	4	4	4	4	6	9
- 60			4	4	4	4	6	8
- 75		4	4	4	4	4	5	5
-100			4	4	4	4	4	4
-150			4	4	4	4	4	

Table 2.--Lake Ontario monthly mean speeds for 1972 (cm s^{-1})

Level (m)	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
				Wind speed				
3	420	280	360	310	320	440	500	490
				Current speed				
- 10		3	6	6	10	13	14	6
- 15		3	5	4	9	9	9	10
- 30		3	3	2	4	6	8	
- 50		3	5	4	5	7	9	
3 from bottom			1	1	1	2	3	
				Vertically averaged current				
			4	3	5	7	8	

LAKE ONTARIO BEGINNING-OF-MONTH LEVELS AND CHANGES IN STORAGE

Frank H. Quinn

Great Lakes Environmental Research Laboratory
Ann Arbor, Michigan

Introduction

This report describes the results of a study of Lake Ontario beginning-of-month levels and changes in storage during IFYGL. The primary aim is to refine the lake storage term of the terrestrial water balance, which in turn will lead to a more accurate determination of lake evaporation through analysis of the water budget. The Thiessen polygon method is used to compute, for each month of the Field Year, the beginning-of-month lake levels, from which the monthly changes in storage are derived.

Methodology

Data from a water-level gage network located around the periphery of the lake was used in computing the beginning-of-month water levels for Lake Ontario. Ideally, these levels should represent the instantaneous levels at the beginning of each month. Practically, however, true representative instantaneous water levels are difficult, if not impossible, to measure because of the effect of short-term fluctuations in wind speed and direction and in barometric pressure. These fluctuations can cause considerable error in computing a true instantaneous level for the lake, but the possibility of error is lessened by specifying that the beginning-of-month level for each gage shall be equal to the average of the daily mean water levels of the first day of the month and the last day of the previous month.

The computation method was developed by Quinn (1971) and consists of applying weighting factors to each water-level gage in the network. The weighting factors are computed from the Thiessen polygon network of 10 water-level gages shown in figure 2. The Lake Ontario beginning-of-month level is thus expressed mathematically as

$$L_o = W_1L_1 + W_2L_2 + W_3L_3 + \ldots\ldots + W_{10}L_{10} \qquad (1)$$

$$\text{for } W_1 + W_2 + W_3 + \ldots\ldots W_{10} = 1.0,$$

where

L_o is the weighted Lake Ontario beginning-of-month water level,

L_1 - L_{10} are the beginning-of-month levels at the 10 gage locations, and

W_1 - W_{10} are the Thiessen polygon weighting factors for gage locations 1 to 10.

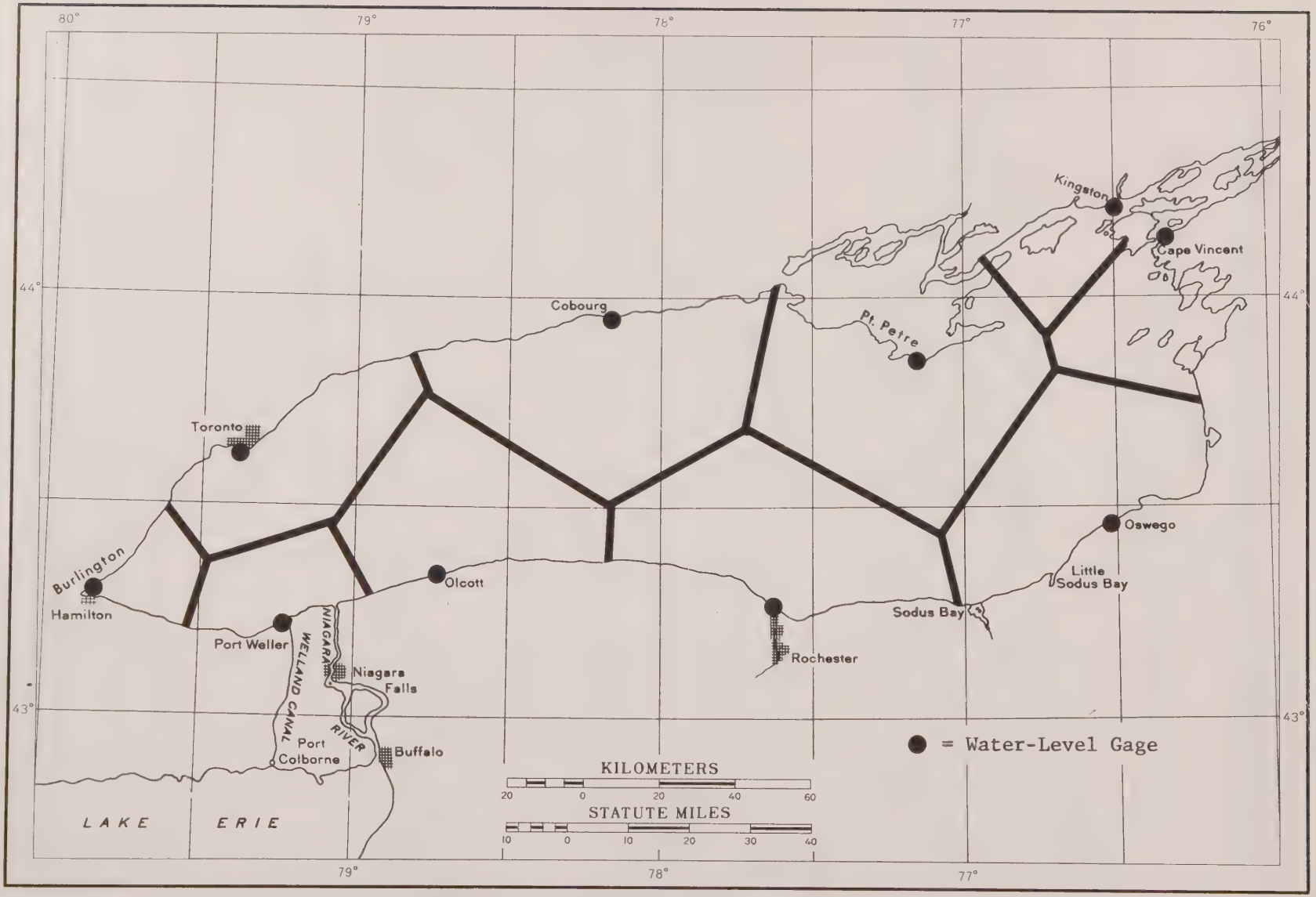

Figure 2.--Ten-gage polygon network

The computed Thiessen weighting factor for each of the water-level gages is given in table 3.

Table 3.--Thiessen polygon weighting factors

Water-level gage	Thiessen weighting factor
Cape Vincent	0.055
Oswego	0.128
Rochester	0.136
Olcott	0.132
Port Weller	0.052
Burlington	0.028
Toronto	0.084
Cobourg	0.161
Kingston	0.040
Point Petre	0.184

The basic data for the study consist of daily mean water levels for each of the 10 gages for the first and last day of each month. The water-level data were obtained from the United States Lake Survey Center and the Canadian Hydrographic Service.

Results

The beginning-of-month water levels, computed for each gage as described above, are presented in table 4. These levels serve as input for eq. (1) in computing the Lake Ontario beginning-of-month levels, also shown in table 4. In figure 3, the levels for the Field Year are compared with the 15-year mean beginning-of-month levels for 1959 through 1973. The latter period was chosen for comparison as it represents the current regulatory regime of the lake, which began in 1958. As seen in figure 3, not only were the lake levels higher than normal during the Field Year, but the seasonal cycle was extremely distorted from December 1972 through March 1973.

The lake storage term derived in this study, defined as the difference between successive Lake Ontario beginning-of-month levels, is compared in table 5 with preliminary values presented by DeCooke and Witherspoon (1974). The beginning-of-month levels used in the latter study are the mean of the beginning-of-month lake levels from six gages around the lake.

Table 4.--Lake Ontario beginning-of-month levels (ft)

Gage	1972									1973		
	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Cape Vincent	244.84	245.80	246.40	246.64	246.73	246.16	245.08	244.38	244.59	244.78	245.87	246.10
Oswego	244.84	245.88	246.40	246.62	246.60	246.07	245.27	244.48	244.65	245.41	245.90	246.06
Rochester	244.93	245.88	246.35	246.61	246.57	246.06	245.26	244.55	244.66	245.38	245.99	246.13
Olcott	244.96	245.91	246.39	246.66	246.61	246.09	245.28	245.58	244.66	245.36	246.15	246.20
Port Weller	245.01	245.90	246.37	246.62	246.57	246.08	245.25	244.60	244.66	245.37	246.20	246.22
Burlington	245.09	246.05	246.50	246.76	246.71	246.25	245.41	244.77	244.77	245.78	246.55	246.35
Toronto	245.07	246.02	246.48	246.75	246.68	246.17	245.33	244.70	244.71	245.43	246.26	246.28
Cobourg	245.04	245.99	246.48	246.71	246.71	246.16	245.26	244.70	244.72	245.47	246.09	246.28
Kingston	244.86	245.81	246.34	246.57	246.61	246.08	245.16	244.43	244.62	245.39	245.80	246.06
Point Petre	244.86	245.63	246.30	246.46	246.53	245.97	245.26	244.43	244.91	245.83	245.81	246.01
Lake Ontario weighted level	244.94	245.39	246.39	246.62	246.62	246.09	245.26	244.55	244.72	245.46	246.02	246.15

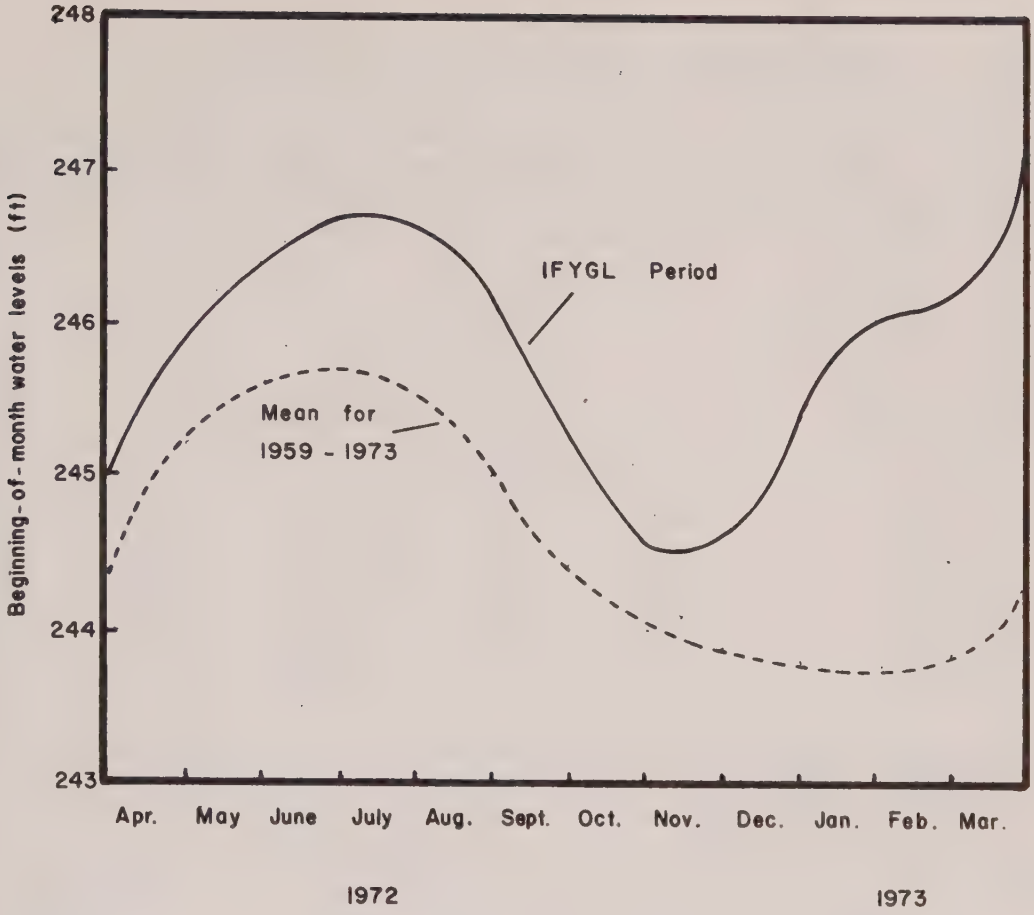

Figure 3.--Comparison of the Lake Ontario beginning-of-month water levels (ft) for the Field Year with the mean beginning-of-month water levels (ft) for the period 1959-1973.

As shown in table 5, the two procedures give similar results on a yearly basis. The primary differences lie in the seasonal distribution of the storage values, which are important for accurate determination of monthly evaporation values. The impact of the lake storage values on evaporation as derived through water-budget computations is shown in table 6. While both sets of values yield approximately the same yearly evaporation, there are differences in the monthly evaporation values, with a definite bias indicated from November through March. This can be attributed to either wind set-up or atmospheric pressure effects that might have disproportionately affected the computations based on the six gages.

Table 5.--Lake Ontario Field Year storage

Month	Lake storage (in.)	
	Quinn	DeCooke and Witherspoon
Apr.	11.16	11.52
May	6.24	5.88
June	2.76	3.00
July	0.00	- 0.36
Aug.	-6.36	- 6.36
Sept.	-9.96	-10.08
Oct.	-8.51	- 8.16
Nov.	2.04	1.20
Dec.	8.88	8.88
Jan.	6.72	7.56
Feb.	1.56	1.80
Mar.	12.12	11.76
Total	26.65	26.64

Table 6.--Lake Ontario Field Year evaporation

Month	Lake evaporation (in.)		Differences (percent)
	Quinn	DeCooke and Witherspoon	
Apr.	0.7	0.4	+ 43
May	0.3	0.6	-100
June	1.3	1.0	+ 23
July	1.7	2.1	- 19
Aug.	3.6	3.6	0
Sept.	3.7	3.8	- 3
Oct.	5.6	5.2	+ 7
Nov.	1.9	2.7	- 42
Dec.	2.2	2.2	0
Jan.	4.1	3.2	+ 22
Feb.	2.1	1.8	+ 14
Mar.	-0.6	-0.2	+ 67
Total	26.6	26.4	+ 1

In addition to the 10 permanent water-level gages on Lake Ontario, 9 temporary gages were installed for part of the Field Year. A comparison of the beginning-of-month lake levels computed by the Thiessen polygon procedure for the 19- and 10-gage networks is shown in table 7. As seen, very little refinement was achieved by using more than 10 gages. Also, complete records for the 9 temporary gages were not available.

Table 7.--Lake Ontario gage-network size analysis

Month	10-gage network	19-gage network	Difference (19 minus 10)
May	245.87	245.88	0.01
June	246.39	246.39	0.00
July	246.62	246.63	0.01
Aug.	246.62	246.62	0.00
Sept.	246.09	246.09	0.00
Oct.	245.26	245.23	-0.03
Nov.	244.55	244.54	-0.01
		Mean	-0.00
		Standard deviation	0.01

Conclusions

The results of this study indicate that it is useful to refine the lake storage term by the use of the Thiessen polygon method and a network of 10, rather than 6, gages. The lake storage values presented in this report should therefore be considered for inclusion in the terrestrial water balance of Lake Ontario.

References

DeCooke, B. G., and D. F. Witherspoon, "An Estimate of the Water Balance of Lake Ontario During International Field Year for the Great Lakes," Proceedings of the Fifty-Fifth Annual Meeting of the American Geophysical Union, April 8-12, 1974, IFYGL, Rockville, Maryland, 1974, pp. 22-39.

Quinn, F. H., "Quantitative Mathematical Models for Great Lakes Research," Ph.D. Dissertation, University of Michigan, Ann Arbor, Michigan, 1971, 127 pp.

U.S. SCIENTIFIC PROGRAM

Based upon reports requested by the U.S. IFYGL Project Office, the progress from January 1 through March 31, 1975, is presented for each of the U.S. IFYGL tasks. Some reports cover work done in April and May.

Panel activity status reports follow the task reports

Tasks

1. *Phosphorus Release and Uptake by Lake Ontario Sediments*

   Principal Investigators: D. E. Armstrong and R. F. Harris - University of Wisconsin

   Task completed.

2. *Net Radiation*

   Principal Investigator: M. A. Atwater - CEM

   Task completed.

3. *RFF/DC-6 Boundary Layer Fluxes*

   Principal Investigator: B. R. Bean - ERL/NOAA

   Task completed.

4. *Nitrogen Fixation*

   Principal Investigator: R. Burris - University of Wisconsin

   Task completed.

5. *Profile Mast and Tower Program*

   Principal Investigator: J. A. Businger - University of Washington

   No report.

6. *Status of Lake Ontario Fish Populations*

   Principal Investigator: J. H. Kutkuhn - Great Lakes Fisheries Laboratory

   The final report is in preparation.

7. *Material Balance of Lake Ontario*

Principal Investigator: D. J. Casey - EPA

No report.

8. *Runoff*

Principal Investigator: L. T. Schutze - U.S. Army Corps of Engineers

Task completed.

9. *Evaporation (Lake-Land)*

Principal Investigator: L. T. Schutze - U.S. Army Corps of Engineers

First-cut estimates for the Field Year are completed. No progress this quarter.

10. *Simulation Studies and Analyses Associated With the Terrestrial Water Balance*

Principal Investigator: B. G. DeCooke - U.S. Army Corps of Engineers

Activity has not begun.

11. *Land Precipitation Data Analysis*

Principal Investigators: L. T. Schutze and R. Wilshaw - U.S. Army Corps of Engineers

No progress this quarter.

12. *Transport Processes Within the Rochester Embayment of Lake Ontario*

Principal Investigators: J. H. Thomas[1] - University of Rochester

Task completed.

13. *Soil Moisture and Snow Hydrology*

Principal Investigator: W. N. Embree - U.S. Geological Survey

The draft of the final report has been reviewed and is being revised.

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[1] G. F. Bonham-Carter is no longer associated with this task.

14. *Boundary Layer Structure and Mesoscale Circulation*

Principal Investigator: M. A. Estoque - University of Miami

See Task 15 below.

15. *Mesoscale Simulation Studies*

Principal Investigator: M. A. Estoque - University of Miami

Observations from the Brockport, N.Y., network during a period of lake breezes (October 2 to 6, 1972) have been analyzed. Analysis of the rawinsonde data from all the IFYGL stations for the same period is also complete. One of the unexpected results is the absence of lake breezes on the Canadian side during periods when such breezes were observed on the United States side. Also unexpected is a pronounced temperature wave above the earth's surface near the 500-m level. The amplitude of this wave is relatively large, with maximum temperatures at 8 p.m. Numerical work on the three-dimensional model continues, involving mainly parameterization of penetrative convection.

16. *Water Transfer Across Large Lake*

Principal Investigator: H. W. Stoughton - State University of New York at Alfred

The Canadian water-level data have been received, and these data and the United States data have been correlated with elevations from the precise level line. Meteorological data have been received from NCC and are being correlated with the level data.

17. *Nearshore Ice Formation, Growth, and Decay*

Principal Investigator: J. Dilley - General Electric Company

No report.

18. *Advection Term - Energy Balance*

Principal Investigator: J. Grumblatt - LSC/NOAA

Little progress has been made this quarter due to delays in obtaining inputs from other investigators. Programs and data dealing with the inflow-outflow portion of the advective term have been transferred from the LSC to the GLERL computer.

19. *Occurrence and Transport of Nutrients and Hazardous Polluting Substances in the Genesee River Basin*

Principal Investigator: L. J. Hetling - New York State Department of Environmental Conservation

Task completed.

20. *Boundary Layer Flux Synthesis*

Principal Investigators: J. A. Almazan[2] - CEDDA/NOAA

A merged data set, consisting of hourly averages of the 6-min samples of the United States buoy and tower meteorological data and the 10-min samples of the Canadian buoy data, has been completed for placement in the IFYGL Archive. Weekly statistical summaries of the meteorological variables from the United States and Canadian hourly averages are being prepared for the entire data set.

A study of the bulk aerodynamic transfer coefficient is in progress. The latent and sensible heat flux measurements obtained by B. Bean over Lake Ontario during the field program and the buoy meteorological data are the two data sets being used in the computations. Preliminary results indicate that the exchange coefficients are similar to those obtained by tower measurements in other studies; however, the ranges of the energy fluxes, stabilities, and wind speeds are greater in the IFYGL data set.

21. *Hazardous Material Flow*

Principal Investigator: T. Davies - EPA

Work on the draft of the final report is continuing.

22. *Remote Measurement of Chlorophyll With Lidar Fluorescent System*

Principal Investigator: H. H. Kim - NASA

Task completed.

23. *Inflow/Outflow Term - Terrestrial Water Budget*

Principal Investigator: P. L. Cox - U.S. Army Corps of Engineers

Task completed.

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[2] J. K. S. Ching is no longer associated with this task.

24. *Use of an Unsteady State Flow Model to Compute Continuous Flow*

Principal Investigator: P. L. Cox - U.S. Army Corps of Engineers

No progress this quarter.

25. *Radiant Power, Temperature, and Water Vapor Profiles Over Lake Ontario*

Principal Investigator: P. M. Kuhn - ERL/NOAA

Work completed.

26. *Algal Nutrient Availability and Limitation in Lake Ontario*

Principal Investigator: G. F. Lee - University of Texas at Dallas

No report.

27. *Wave Studies*

Principal Investigator: P. C. Liu - LSC/NOAA

Digitized wave data on nine-track binary magnetic tapes have been sent to NCC, bringing the archiving of the wave data close to completion. Detailed analyses of wave spectra are continuing. A paper entitled "IFYGL Ship Wave Observations vs. Wave Measurements" will be presented at the 18th Conference on Great Lakes Research in May.

28. *Cloud Climatology*

Principal Investigator: W. A. Lyons - University of Wisconsin, Milwaukee

No report.

29. *Zooplankton Production in Lake Ontario as Influenced by Environmental Perturbations*

Principal Investigator: D. C. McNaught - State University of New York at Albany

Task completed.

30. *Change in Lake Storage Term - Terrestrial Water Budget*

Principal Investigator: R. Wilshaw - U.S. Army Corps of Engineers

Daily mean water surface elevations of Lake Ontario for the Field Year have been derived from data collected at 19 gage stations in the United States and Canada.

31. *Soil Moisture*

Principal Investigator: L. T. Schutze - U.S. Army Corps of Engineers

Work not begun.

32. *Testing of COE (Corps of Engineers) Lake Levels Model*

Principal Investigator: E. Megerian - U.S. Army Corps of Engineers

This task has been canceled.

33. *Nearshore Study of Eastern Lake Ontario*

Principal Investigator: R. B. Moore - State University of New York at Oswego

Task completed.

34. *Internal Waves - Transects Program - Interpretation of Whole-Basin Oscillations*

Principal Investigator: C. H. Mortimer - University of Wisconsin, Milwaukee

Temperature distribution plots have been completed for 120 transects across two sections of Lake Ontario: Braddock Point to Presq'ile and Oswego to Prince Edward Island. These plots include isotherms computed from bathythermograph slides and undulator data, as well as relevant temperature readings from the United States and Canadian fixed temperature profilers, current meters, and meteorological buoys. Plots have been prepared of isotherm depth vs. time at the United States buoys and fixed temperature profilers for the 5-day transect periods, July 24 to 28, August 7 to 11, and October 2 to 6, 1972. The transect and coastal chain measurements are being compared, and the results will be combined with plots of temperature distribution for the Canadian transect between Olcott and Oshawa for inclusion in a final data report.

35. Pontoporeia affinis *and Other Benthos in Lake Ontario*

Principal Investigator: S. C. Mosley - University of Michigan

No report.

36. *Pan Evaporation Project*

Principal Investigators: C. N. Hoffeditz - NWS/NOAA and J. A. W. McCulloch - AES, Canada

No progress this quarter.

37. *Simulation Studies and Other Analyses Associated With U.S. Water Movements Projects*

Principal Investigators: J. P. Pandolfo and C. A. Jacobs - CEM

Task completed.

38. *Structure of Turbulence*

Principal Investigator: H. A. Panofsky - Pennsylvania State University

Task completed.

39. *Airborne Snow Reconnaissance*

Principal Investigator: E. L. Peck - NWS/NOAA

Task completed.

40. *Optical Properties of Lake Ontario*

Principal Investigator: K. R. Piech - Calspan Corporation

No report.

41. *Storage Term - Energy Balance Program*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

Further work continues to depend on the availability of IFYGL ship data. Comparison of preliminary heat storage estimates for 1 week in October 1972 based on ship data and on United States and Canadian buoy data indicates a significant difference when the lake is unstable. The buoy data will be examined spatially and temporally to identify reasons for the apparent bias and the feasibility of applying an algorithm that could accomodate partial data.

42. *Sensible and Latent Heat Flux*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

The United States dewpoint data set is being edited, and the Canadian overwater relative humidity data are being converted to dewpoint to make the two sets compatible. Various time and spatial averaging techniques are being applied to a limited data set to determine how these affect the Bowen ratio.

43. *Thermal Characteristics of Lake Ontario and Advection Within the Lake*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

As in the case of Task 41, further work depends upon availability of ship data.

44. *Oswego Harbor Studies*

Principal Investigator: G. L. Bell - GLERL/NOAA

Work is continuing on the final report.

45. *Mapping of Standing Water and Terrain Conditions With Remote Sensor Data*

Principal Investigator: F. C. Polcyn - ERIM

Task completed.

46. *Remote Sensing Program for the Determination of* Cladophora *Distribution*

Principal Investigators: F. C. Polcyn and C. T. Wezernak - ERIM

Task completed.

47. *Remote Sensing Study of Suspended Inputs Into Lake Ontario*

Principal Investigators: F. C. Polcyn and C. T. Wezernak - ERIM

Task completed.

48. *Island-Land Precipitation Data Analysis*

Principal Investigator: F. H. Quinn - GLERL/NOAA

"Lake Ontario Basin: Overland Precipitation, 1972-73," by David C. Norton, has been published as NOAA Technical Memorandum ERL GLERL-1. The first-cut overwater values for the atmospheric water budget studies have been documented in a memorandum entitled "Estimated Precipitation Over Lake Ontario by Thiessen Polygons."

Tabulation of all data for the island precipitation network in eastern Lake Ontario is complete, except for a small amount of Canadian data that are not yet available. Review of precipitation data from the towers and land station continues.

49. *Lake Circulation, Including Internal Waves and Storm Surges*

Principal Investigator: D. B. Rao - GLERL/NOAA

No report.

50. *Atmospheric Water Balance*

Principal Investigator: E. M. Rasmusson - CEDDA/NOAA

Data from periods 1 and 3 (October 2 to 18 and November 21 to December 10, 1972) have been analyzed by the asymptotic singular decomposition (ASD) method, which completes the validation of the basic rawinsonde data set. A "Preliminary Report on Wind Errors Encountered During Automatic Processing of IFYGL LORAN-C Data," by J. Sullivan and J. Matejceck, is being published as NOAA Technical Memorandum EDS CEDDA-2.

Analyses of the water budget for period 2 (October 30 to November 14) is nearing completion. The results are in general quite encouraging; plausible values and relationships with vertical stratification and the synoptic situation are being obtained for kinematic quantities, such as mass divergence, vorticity, and vertical velocity. The value of mean overlake evaporation for the 16-day period computed from preliminary precipitation estimates provided by J. W. Wilson and S. J. Bolsenga is close to 5 mm/day. These results will be presented at the 18th Conference on Great Lakes Research in May.

A numerical experiment, in which "controlled" random errors were introduced into the basic meteorological fields, was begun in order to obtain a better estimate of the probable errors in the computed water balance parameters. Kinematic quantities and E-P (evaporation minus precipitation) are computed from these randomized data. Results are very tentative at this stage, but there are indications that larger random errors than previously believed can probably be tolerated in the basic data.

51. *Evaporation Synthesis*

Principal Investigator: F. H. Quinn - GLERL/NOAA

First-cut evaporation data continue to be generated by the investigators in the various tasks involved.

52. *Groundwater Flux and Storage*

Principal Investigator: E. C. Rhodehamel - U.S. Geological Survey.

Task completed.

53. *Spring Algal Bloom*

Principal Investigator: A. Robertson - GLERL/NOAA

Because of large gaps in scheduled sampling and delays in obtaining data, this task has been canceled.

54. *Ice Studies for Storage Term - Energy Balance*

Principal Investigator: F. H. Quinn - GLERL/NOAA

Task completed.

55. *Lagrangian Current Observations*

Principal Investigator: J. H. Saylor - GLERL/NOAA

Compilation of data for the final report continues.

56. *Circulation of Lake Ontario*

Principal Investigator: J. H. Saylor - GLERL/NOAA

No activity this quarter.

57. *Phytoplankton Nutrient Bioassays in the Great Lakes*

Principal Investigator: C. Schelske - University of Michigan

Task not activated.

58. *Runoff Term of Terrestrial Water Budget*

Principal Investigator: G. K. Schultz - U.S. Geological Survey

Task completed.

59. *Coastal Chain Program*

Principal Investigator: J. T. Scott - State University of New York at Albany

Daily current "roses" and resultants have been calculated for each coastal chain station at prescribed depths. During the second alert, downwelling was present at all coastal chains, which is consistent with lakewide cyclonic circulation. During the first alert, there is evidence of upwelling at the Canadian and downwelling at the United States chains, except at Olcott. Flow was eastward along both shores during this alert. Data for the third alert indicate fair weather bias, with downwelling at the Canadian and both upwelling and downwelling at the United States coastal chains.

A paper by D. R. Landsberg and J. T. Scott entitled "On the Circulation in Lake Ontario" will be presented at the 18th Conference on Great Lakes Research in May. Another paper in preparation is "Longshore Transport in the Coastal Zone of Lake Ontario During IFYGL," by J. T. Scott and G. T. Csanady.

60. *Analysis of Phytoplankton Composition and Abundance*

Principal Investigator: E. F. Stoermer - University of Michigan

Task completed.

61. *Clouds, Ice, and Surface Temperature*

Principal Investigator: A. E. Strong - NESS/NOAA

No report.

62. *Analysis and Model of the Impact of Discharges From the Niagara and Genesee Rivers on Nearshore Biology and Chemistry*

Principal Investigator: R. A. Sweeney - State University of New York at Buffalo

Task completed.

63. *NCAR/DRI - Buffalo Program*

Principal Investigator: J. W. Telford - Desert Research Institute, University of Nevada

Analysis of aircraft data continued. A paper on "Aircraft Measurements of Variability of Airflow Over a Large Lake," by A. Vaziri and J. W. Telford, will be presented at the First AMS Conference on Regional and Mesoscale Modeling, Analysis and Prediction in Las Vegas, Nevada, in May 1975. The abstract of this paper is as follows:

"Aircraft measurements of air motion, temperature, pressure and moisture in the boundary layer over Lake Ontario are presented. The aircraft is equipped with a high quality inertial reference platform and an integrated data handling system. The data, recorded at a rate of six samples per second, supports an estimated absolute accuracy of 0.1 ms^{-1} in the vertical and a short term accuracy of 0.3 ms^{-1} in the horizontal components of the air motion. Horizontal accuracy of longer periods depends on updating of the inertial measuring system.

"As an example, the data collected on one flight in October 1972 is presented and a number of interesting features relevant to airflow over a lake are displayed.

"Among the more pronounced features of the air motion are: strong variation with height, changes at adjacent horizontal positions, a periodic structure, and detailed correspondence of its variation with potential temperature and vapor mixing ratio.

"These features indicate that air streams probably change their height, allowing substantial vertical transport of heat, moisture and momentum even when the eddy fluxes are negligible. Further, while the atmosphere shows strong demarkation zones where the potential temperature increases and often the vapor mixing ratio decreases, these are by no means very extensive either in horizontal position or time. The detailed correspondence of variations of air motion, potential temperature and mixing ratio indicate a possibility that these variations may be a signature identifying an air mass through short term changes. Stable temperature changes are seen to have small geographic and temporal extent, and it appears that certain conclusions from models of mesoscale flow based on a single sounding may be very misleading in terms of the basic physics when interpreting such conditions as described here over Lake Ontario."

64. *Mathematical Modeling of Eutrophication of Large Lakes*

Principal Investigator: R. V. Thomann - Manhattan College

Main emphasis during the quarter was placed on computing simulations for various waste-loading schemes. This work is being done with the previously verified, three-segment, LAKE 1 model.

65. Cladophora *Nutrient Bioassay*

Principal Investigator: G. F. Lee - University of Texas at Dallas

Inactive.

66. *Sediment Oxygen Demand*

Principal Investigator: N. A. Thomas - EPA

All work on this task has been completed. A report in draft form has been prepared and will be presented at the 18th Conference on Great Lakes Research in May. The average sediment oxygen demand for Lake Ontario during IFYGL was 0.24 g O_2/m^2/day.

67. *Main Lake Macrobenthos*

Principal Investigator: N. A. Thomas - EPA

A report on the distribution of benthic organisms for October 1972 has been prepared. Another report based on the June 1972 collections should be available in July.

68. *Exploration of Halogenated Hazardous Chemicals in Lake Ontario*

Principal Investigators: G. F. Lee - University of Texas - Dallas
C. L. Haile - University of Wisconsin

Task completed.

69. *Basin Precipitation - Land and Lake*

Principal Investigator: J. W. Wilson - CEM

The final daily precipitation totals for the entire Field Year, based on the combined radar and gage data for the lake and watershed, are almost complete and will be available in April. The only task remaining is to merge the Oswego and Buffalo totals onto one tape. The values are assigned to a Cartesian grid with a mesh length of 3.5 mi.

During the quarter, empirical range-correction curves, varying with precipitation type and freezing-level height, were developed for the Buffalo radar, and these corrections were applied to derive range-adjusted radar daily precipitation totals. As in the case of the Oswego radar, daily correction fields were obtained from an analysis of gage-to-radar ratios and were then used in correcting the Buffalo range-adjusted radar totals.

The gage-corrected radar totals were combined with the gage-only precipitation analysis. The weight given to the gage-corrected radar analysis or gage-only analysis varies linearly with the distance from a gage.

70. *Evaluation of ERTS Data for Certain Hydrological Uses*

Principal Investigators: D. R. Wiesnet and D. F. McGinnis - NESS/NOAA

All work related to this task, and the final report, are complete. Conclusions drawn from this study are:

Snow Mapping

(1) Snow maps can be produced six times faster from ERTS-1 imagery than from high altitude (20,000 m) aerial photographic surveys.

(2) ERTS-1 images can be used most effectively for snow mapping basins of moderate size (250 to 30,000 km^2).

(3) The 18-day return period plus the delay in receiving data make ERTS-1 unusable for operational purposes.

(4) The cost of snow maps produced from ERTS-1 MSS or NOAA-2 VHRR imagery is estimated to be approximately one to two hundredths of the cost of the simplest maps made from aircraft surveys.

(5) In the Lake Ontario basin, the ERTS-1 data proved inadequate for basinwide snow mapping owing to the basin's large areal extent (70,000 km^2) and the cloudiness over the area. Nevertheless, by using ERTS-1 MSS data in conjunction with NOAA-2 VHRR data, we consistently found that the latter could be interpreted better and with greater accuracy.

(6) In thickly forested areas, such as the Adirondack Mountains, snow cannot be observed except in clearings and on ice-covered lakes.

(7) Visual discrimination of snowlines from ERTS-1 at small lakes (1:1,000,000) is far easier than CCT discrimination at large scales (1:15,000).

Lake Ice

(1) The 18-day revisit cycle for ERTS-1 is highly inadequate for monitoring ice formation, movement, and breakup in the Great Lakes area.

(2) Sidelap analyses of 24-hr ice movement can provide Lagrangian current information for portions of the Great Lakes.

(3) Spectral reflectance information available from the MSS allows inferences to be drawn concerning condition of the ice pack.

Lake Currents

(1) Considerable detailed information on lake currents can be inferred or measured from ERTS-1 data by analyzing ice fragment or algae movement and sediment patterns.

Soil Moisture

(1) Neither CCT printouts nor ERTS-1 MSS imagery provided a means to assess soil moisture in the vegetated farmland of the Finger Lakes region of New York State.

(2) Spectral curves can be generated from densitometric measurements taken from aircraft multispectral images and used for soil moisture analysis, but unless the fields are devoid of vegetation and of the same soil type the usefulness of such analysis is conjectural.

71. *Distribution, Abundance, and Composition of Invertebrate Fish Forage Organisms in Lake Ontario*[3]

Principal Investigator: R. F. Heberger, Jr.[4] - Great Lakes Fisheries Laboratory

The final report is in preparation.

72. *Coastal Circulation in the Great Lakes*

Principal Investigator: G. T. Csanady - Woods Hole Oceanographic Institution

In continuing interpretation of IFYGL data, especially of the coastal chain data from the July and October 1972 alert periods, a study has been prepared documenting the presence of topographic waves along the north shore of Lake Ontario. These waves have much the same propagation velocities as internal Kelvin waves and observed flow reversal events are legitimately interpreted as a consequence of the passage of both types of waves. On some occasions at least phase separation can be observed after a few days travel around the lake. A copy of a paper entitled "Topographic Waves in Lake Ontario" (WHOI Contribution No. 3543) is to be published shortly in Journal of Physical Oceanography.

Work has also continued, in a joint effort with J. T. Scott of SUNY, Albany, on the presentation and interpretation of total longshore transport. A lecture was presented at the Vancouver CMS meeting on long-term average lake circulation, as well as at the 18th Conference on Great Lakes Research in May. Work on this topic is still in progress. Another review article, "The Coastal Jet Conceptual Model in the Dynamics of Shallow Seas" will appear in The Sea, presumably in early 1976.

73. *Lake Water Characteristics*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

Progress on this task is directly related to Task 7.

74. *Snow Observation Network*

Principal Investigator: Robert B. Sykes, Jr. - State University of New York at Oswego

Task completed.

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[3] The title of this task has been modified.

[4] R. F. Heberger has replaced J. H. Kutkuhn as Principal Investigator.

75. *Lake Circulation Model*

Principal Investigator: J. R. Bennett - Massachusetts Institute of Technology

Last year it was found that the temperature field for July 1972 computed with the three-dimensional model agreed reasonably well with the buoy data analyzed by R. L. Pickett and F. P. Richards, but the computed currents did not. The current near the north shore was computed to be toward the east, in the direction of the mean wind; the observed current was toward the west. The coastal chain studies by G. T. Csanady and J. T. Scott seemed to confirm the latter finding.

The current toward the east near the north shore is part of the "two-cell" pattern that is common to nearly all lake models and is well understood. In the shallow water the direct effect of the wind is larger than that of the longshore pressure gradient; thus, the only efficient way to change the direction of the computed current is to "fudge" the wind field. Adding a cyclonic curl to the wind stress field computed from the buoy wind brought about improvement, but the magnitude required implied a 50 percent variation of wind stress across the lake, a value probably not within the range of error in the actual wind measurements.

In April of this year I visited Joe Simons at CCIW to compare my results with his. He found that his model tended to overestimate the upwelling on the north shore during the summer months. Both models appeared consistent, the only differences being mainly due to different drag coefficients. Using these clues, I began a detailed analysis of the model's temperature field. I soon found that the temperature computations were not very sensitive to the wind stress curl; the model was incorrect. Although this analysis is still in progress, it appears that the poor resolution of the shore zones is responsible for the poor verification--in particular, the fact that the model has no discernable Kelvin wave is probably crucial. The observations by Csanady and Scott show that the upwelled thermocline on the north shore returns much more quickly to its equilibrium position than in the models.

76. *Lake Ontario Invertebrate Fauna List*

Principal Investigator: A. Robertson - GLERL/NOAA

This task was inactive this quarter.

77. *Distribution and Variability of Physical Lake Properties*

Principal Investigator: R. Pickett - GLERL/NOAA

Preliminary monthly resultant currents have been calculated from the edited IFYGL buoy and tower data. Figures 4 through 16 show these currents at -15 and -30 m, the two depths for which maximum amount of data was available. Each barb represents 1 cm s^{-1}; each flag, 5 cm s^{-1}.

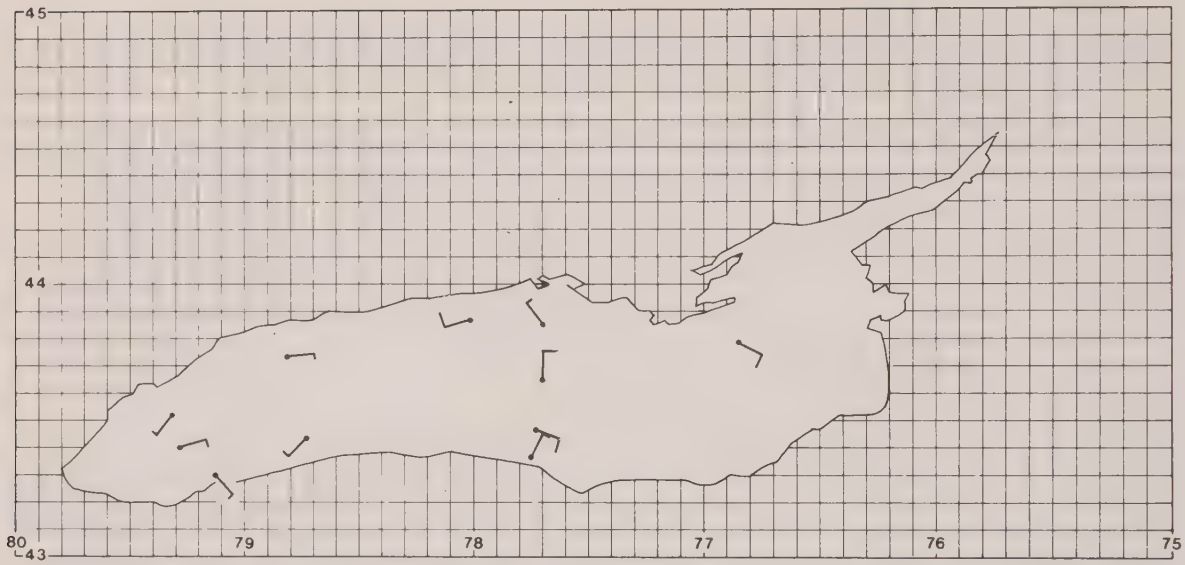

Figure 4.--Monthly resultant currents for May 1972 σ_t [illegible] depth.

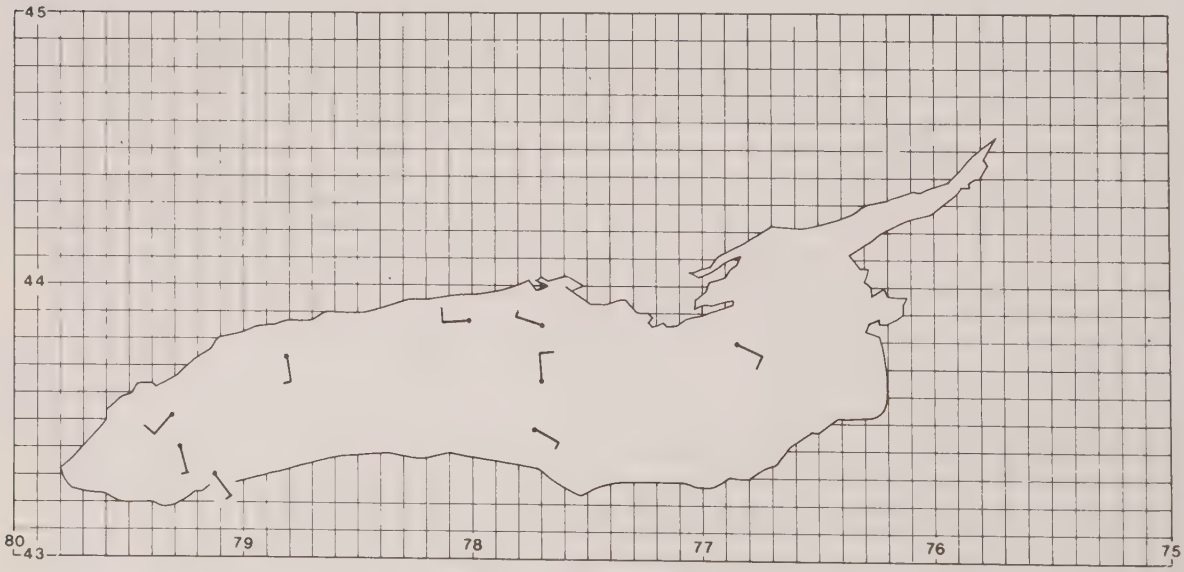

Figure 5.--Monthly resultant currents for May 1972 at 30-m depth.

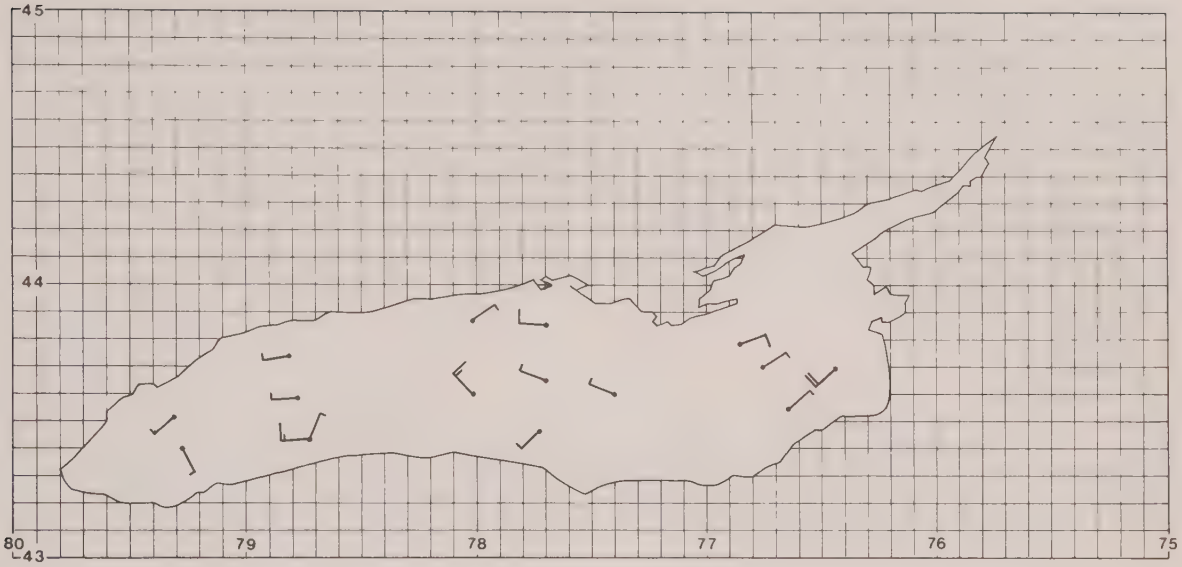

Figure 6.--Monthly resultant currents for June 1972 at 15-m depth.

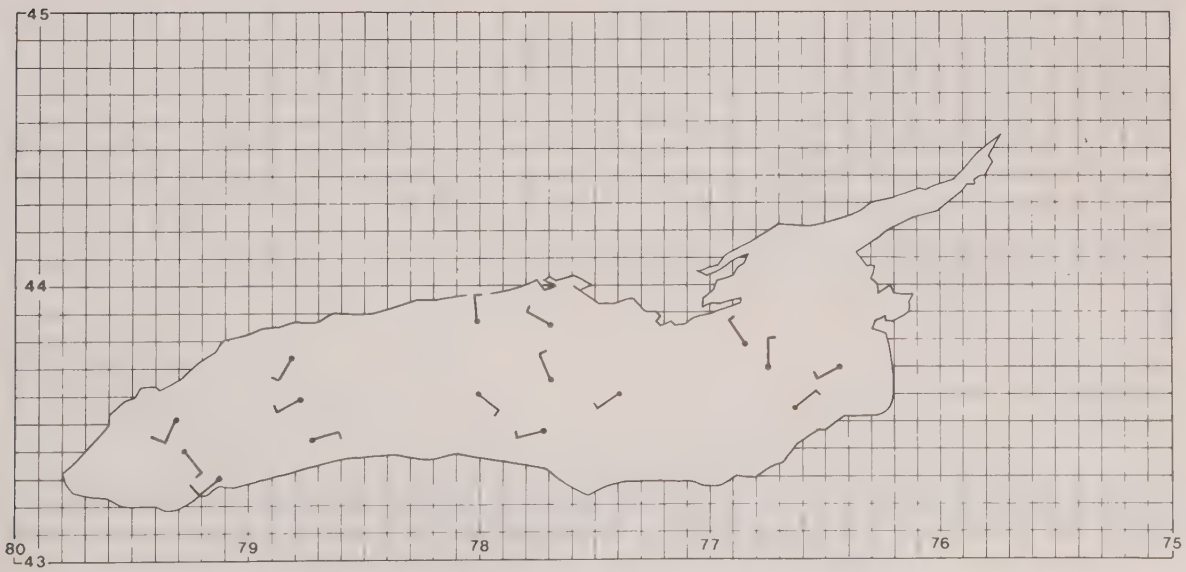

Figure 7.--Monthly resultant currents for June 1972 at 30-m depth.

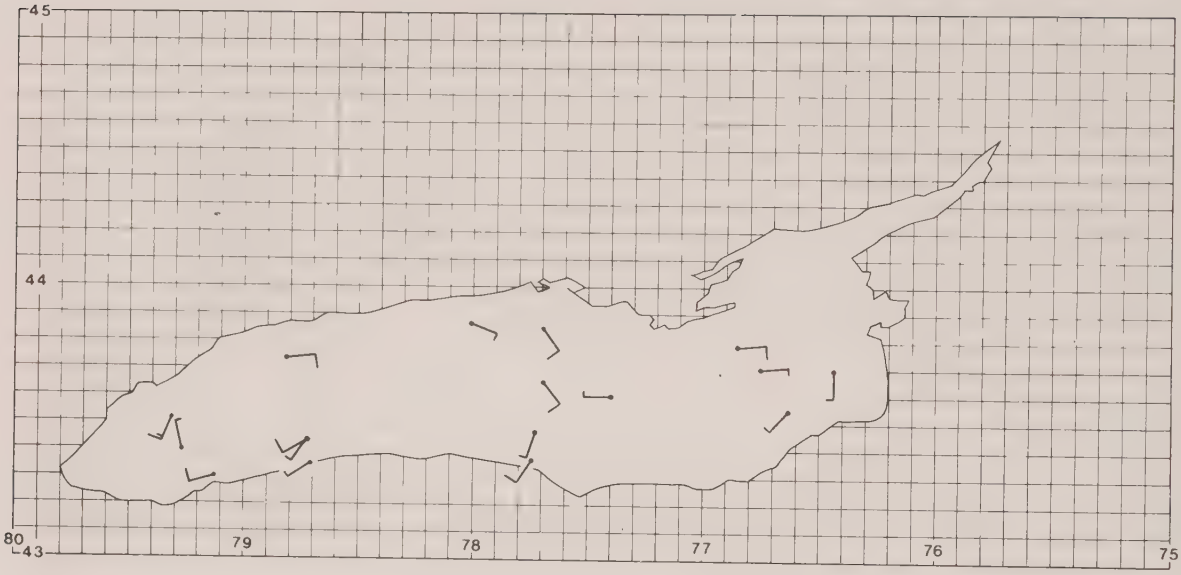

Figure 8.--Monthly resultant currents for July 1972 at 15-m depth.

Figure 9.--Monthly resultant currents for July 1972 at 30-m depth.

Figure 10.--Monthly resultant currents for August 1972 at 15-m depth.

Figure 11.--Monthly resultant currents for August 1972 at 30-m depth.

Figure 12.--Monthly resultant currents for September 1972 at 15-m depth.

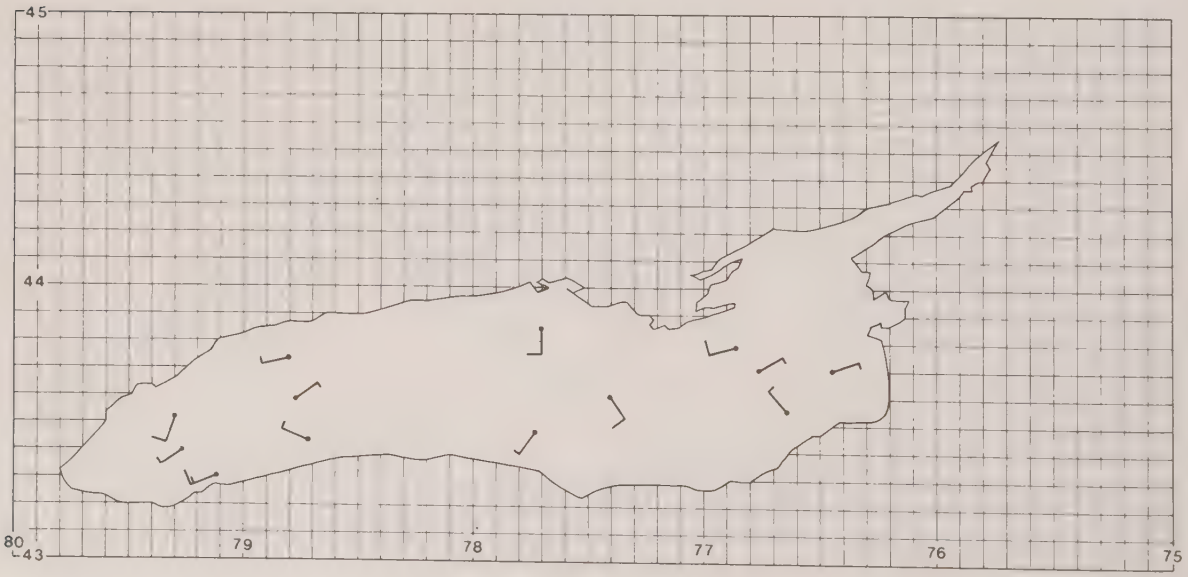

Figure 13.--Monthly resultant currents for September 1972 at 30-m depth.

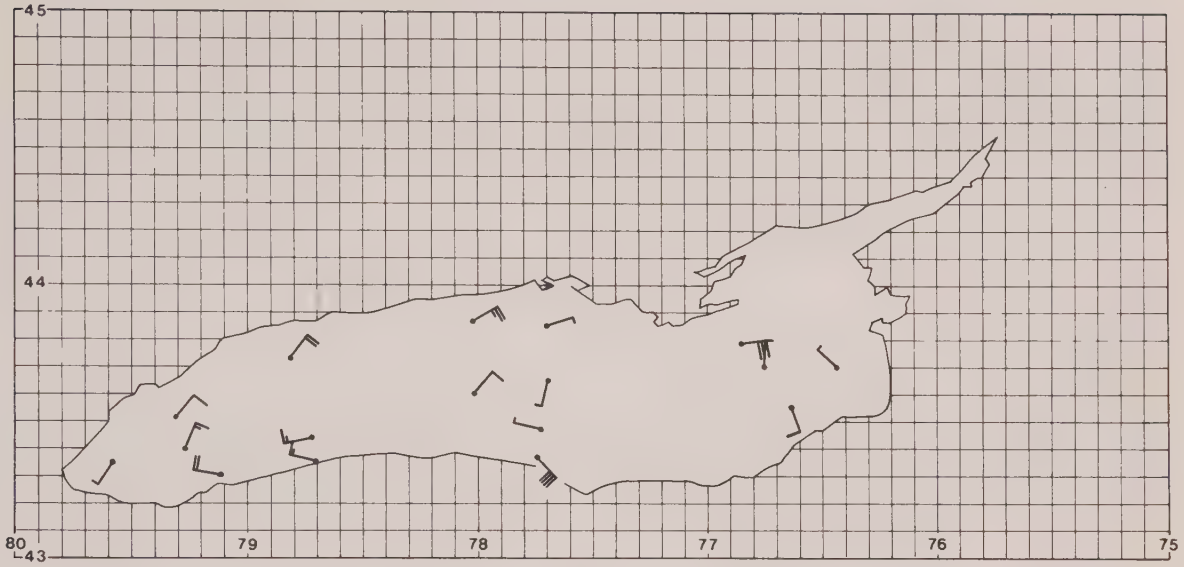

Figure 14.--Monthly resultant currents for October 1972 at 15-m depth.

Figure 15.--Monthly resultant currents for October 1972 at 30-m depth.

Figure 16.--Monthly resultant currents for November 1972 at 15-m depth.

The significance of each current sample at these and other levels will be investigated next, from which, together with thermocline depth charts, geostrophic analysis, and numerical models, it is hoped that the monthly circulation pattern of Lake Ontario can be deduced.

78. *Carbon Cycle Model*

Principal Investigators: A. Robertson and B. Eadie - GLERL/NOAA

Development of a model of Lake Ontario carbon flow is proceeding on schedule.

Panel Reports

Biology and Chemistry - N. A. Thomas, U.S. Panel Cochairman

Four of the U.S. biology-chemistry reports have been published through the Environmental Protection Agency's Ecological Series. The reports have been archived at NCC. Six additional reports are expected to be printed by mid-summer.

The Biology-Chemistry Panel is attempting to produce a biological stations report for Lake Ontario by the fall of 1975.

Terrestrial Water Balance - B. G. DeCooke, U.S. Panel Cochairman

During the January-March 1975 quarter, estimates of daily mean elevations of the Lake Ontario water surface during the Field Year were completed. Daily precipitation estimates on the U.S. land area of the Ontario basin were published for 1972 and 1973. It is anticipated that the first draft of the panel's final scientific report will be started in July.

DATA MANAGEMENT - IFYGL ARCHIVE

Tables 8 and 9 contain a summary listing of data available from the U.S. IFYGL Archive at NCC. In the column labeled "Archive," Y = Yes (will be placed in U.S. IFYGL Archive at NCC), YC = Yes (will be placed in IFYGL Archives at NCC and CCIW), and N = No (will not be placed in the Archive). Requests for data should be directed to:

IFYGL Data Manager, Room 52
Environmental Data Service
National Oceanic and Atmospheric
Administration
Federal Building
Asheville, N.C. 28801

Tel: (704) 258-2850, ext. 754; FTS (704) 254-0754.

Table 8.--Summary of data available from final IFYGL Archive: United States

TASK NO	INVESTIGATOR		DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL		ATMOSPHERIC BOUNDARY LAYER			
3	Bean		RFF/DC-6 (Gust Probe)			
		3.	Reduced turbulence data - Binary	Mag Tape	At NCC	Y
		4.	Computed flux, Time series spectra	Microfilm	At NCC	YC
		5.	Time series graphics(U,V,W,T,PV)	Microfilm	At NCC	YC
		6.	Means, Variances and Fluxes	Microfilm	At NCC	YC
		7.	Plots of Flight Paths	Microfiche	At NCC	YC
		8.	Spatial-Temporal Variations in Turbulence Fluxes	Microfiche	At NCC	YC
5	Businger		Profile Mast and Tower			
		5.	Computed profile & Flux data, 15 minute and hourly averages	Mag Tape	May 1975	YC
		6.	Final Report	Microfiche	Jan 1976	YC
		7.	Edited Met. Data - Selected profiles	Mag Tape	May 1975	Y
14	Estoque		Boundary Layer Structure			
		3.	Tethered balloon (BLIP)	Microfilm	At NCC	YC
		7.	PIBAL observations-wind components	Microfilm	At NCC	YC
15	Estoque		Mesoscale Simulation Studies			
		1.	Final Report	Microfiche	June 1976	Y
20	Almazan		Boundary Layer Flux Synthesis			
		1.	Final Report	Microfiche	June 1976	Y
38	Panofsky		Turbulence-Niagara Bar Tower			
		3.	Reduced wind speed fluctuations	Mag Tape	May 1975	YC
		4.	System description report	Microfiche	May 1975	Y
		5.	Two-Point Statistics over Lake Ontario	Microfiche	At NCC	YC
63	Telford		NCAR/DRI Aircraft			
		5.	Final data report-Computed fluxes of momentum, heat, vapor (1/minute)	Microfiche	June 1975	YC
		6.	Final Report	Microfiche	June 1976	Y
	PANEL		BIOLOGY - CHEMISTRY			
1.	Armstrong		Sediment Analysis			
		2.	Phosphorus Uptake-Release by Sediments	Microfiche	At NCC	YC
4	Burris		Water Sample - Analysis			
		2.	Final Report	Microfiche		YC
6	Kutkuhn		Status of Fish Population			
		1.	Fish samples-Size,Numbers,Scale collections	Microfiche	May 1975	YC
		3.	Water temperature (BT)	Microfilm	May 1975	YC
		4.	Digitized BT-5 fathoms	Pun'd Cards	May 1975	YC
		6.	Final Report	Microfiche	Dec 1975	YC
7	Casey		Material Balance			
		1.	Material balance data in STORET	STORET	At NCC	Y
		3.	Final Report - Streams	Microfiche	July 1975	YC
		4.	Final Report - Main Lake	Microfiche	Dec 1975	Y
12	Thomas		Rochester Embayment Study			
		4.	Current speed and direction, water temperature, wind	Mag Tape	At NCC	YC
		12.	Final Report	Microfiche	May 1975	Y

Table 8.--Summary of data available from final IFYGL Archive: United States (continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	BIOLOGY - CHEMISTRY (Con'd)			
19	Hetling	Transport of Nutrients			
	1.	Nutrient transport data in STORET	STORET	At NCC	Y
	3.	Final Report	Microfiche	July 1975	YC
21	Davies	Hazardous Material Flow			
	1.	Hazardous material data in STORET	STORET	At NCC	Y
	3.	Final Report	Microfiche	Dec 1975	YC
22	Kim	Remote Measurement of Chlorophyll			
	3.	New Algae Mapping Technique	Microfiche	At NCC	YC
26	Lee	Algal Nutrient Availability			
	3.	Final Report	Microfiche	Sept 1975	YC
29	McNaught	Zooplankton Production			
	1.	Zooplankton data in STORET	STORET	At NCC	Y
	6.	Final Report	Microfiche	August 1975	YC
33	Moore	Nearshore Study			
	1.	Nearshore data in STORET	STORET	At NCC	Y
	5.	Final Report	Microfiche	May 1975	Y
35	Mosley	Benthos Study			
	1.	Benthos study data in STORET	STORET	At NCC	Y
	4.	Final Report	Microfiche	June 1975	YC
44	Bell	SHENEHON (Ship) Data			
	2	Final Meteorological/6 minute, Hourly and Daily data	Mag Tape	Dec 1975	YC
	5.	Chemical/digitized BT (1 meter)	Mag Tape	May 1975	YC
	6.	Final Report (Oswego Harbor)	Microfiche	Sept 1975	YC
46	Polcyn	Cladophora Sensing			
	1.	Cladophora Distribution	Microfiche	At NCC	Y
47	Polcyn	Suspended Sediments Sensing No special report for this task. See Final Report for Task 45, Remote Sensing - Terrain -			
60	Stoermer	Phytoplankton			
	1.	Phytoplankton data	STORET	At NCC	Y
	3.	Data count-Pre-report	Microfiche	At NCC	YC
	4.	Data Analysis-Lakewide Changes	Microfiche	At NCC	YC
	5.	Phytoplankton Composition & Abundance	Microfiche	At NCC	YC
62	Sweeney	River Discharge Impacts			
	1.	Nearshore Bio-Chem STORET data	STORET	At NCC	Y
	6.	Final Report	Microfiche	July 1975	YC
64	Thomann	Eutrophication Model			
	1.	Final Report	Microfiche	June 1976	Y
66	Thomas	Sediment Oxygen Demand			
	1.	Sediment oxygen data in STORET	STORET	At NCC	Y
	3.	First Status Report	Microfiche	July 1975	YC
	4.	Final Report	Microfiche	July 1975	YC

Table 8.--Summary of data available from final IFYGL Archive: United States (continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	BIOLOGY-CHEMISTRY (Con'd)			
67	Thomas	Lake Macrobenthos			
	1.	Distribution of Benthic Organisms	Microfiche	July 1975	YC
	2.	Sediment Particle Size,Composition	Microfiche	July 1975	YC
	3.	Final Report	Microfiche	July 1975	YC
68	Lee	Hazardous Chemicals			
	1.	Hazardous chemical STORET data	STORET	At NCC	Y
	4.	First Status Report	Microfiche	May 1975	YC
	5.	Final Report	Microfiche	May 1975	YC
71	Kutkuhn	Fish Forage Organisms			
	1.	Invertebrate Speciment Inventory	Pun'd Cards	June 1975	YC
	2.	Final Report	Microfiche	Nov 1975	YC
73	Pinsak	Lake Water Characteristics			
	1.	Edited Depth, Temperature, Chemical composition data	Mag Tape	At NCC	YC
76	Robertson	Fauna List			
	1.	Final Report	Microfiche	At NCC	Y
	PANEL	ENERGY BALANCE			
2	Atwater	Net Radiation			
	1.	Interim Reports	Microfiche	At NCC	Y
	2.	Net radiation data for grid	Mag Tape	At NCC	Y
	3.	Final Report	Microfiche	At NCC	Y
17	Pavlak	Nearshore Ice Formation			
	2.	Meteorological data-Van (Temperature, Wind, Radiation,Pressure)	Mag Tape	At NCC	YC
	4.	Analysis of Lake Shore Ice Formation, Growth, and Decay-IFYGL Phase 2	Microfiche	At NCC	YC
	5.	Data Report	Microfiche	At NCC	YC
18	Grumblatt	Advection Term-Energy Balance			
	2.	Water temperature,5-minute intervals	Mag Tape	At NCC	YC
	3.	Final Report	Microfiche	June 1975	YC
28	Lyons	Cloud Climatology			
	2.	1 Hour averages (Planimetered)	Microfiche	May 1975	YC
	7.	Final Report	Microfiche	August 1975	YC
36	Hoffeditz	Evaporation Pan Network (US & CDN)			
	1.	Radiation, Incident LW & SW hourly totals	Pun'd Cards	July 1975	YC
	2.	Evaporation Pan data (US & CDN)	Pun'd Cards	July 1975	YC
	4.	4 Reports & Final Report	Microfiche	Oct 1975	YC
40	Piech	Lake Optical Properties			
	4.	Turbidity Measurements - Irradiance meter/transmissometer - graphs	Microfiche	June 1975	YC
	5.	Documentation-Location of measurements Final Report	Microfiche	Oct 1975	YC
41	Pinsak	Lake Heat Storage			
	1.	Weekly mean water temperatures for lake cells	Microfiche	June 1976	Y
	2.	Final Report	Microfiche	June 1976	Y

Table 8.--Summary of data available from final IFYGL Archive: United States (continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	ENERGY BALANCE (Con'd)			
42	Pinsak	Sensible & Latent Heat Flux			
	1.	Final Report	Microfiche	June 1976	Y
43	Pinsak	Lake Thermal Advection			
	1.	Final Report	Microfiche	June 1976	Y
54	Quinn	Lake Ontario Ice Studies			
	1.	Ice Thickness - Manual Measurement A. 5 sites, weekly B. Ice patterns-graphic display C. Surface meteorological data D. Albedo measurement	Microfiche	At NCC	YC
61	Strong	Satellite			
	3.	Final Report	Microfiche	June 1975	YC
	PANEL	TERRESTRIAL WATER BALANCE			
8	Schutze	Runoff			
	1.	Weekly streamflow data	Microfiche	June 1976	Y
	2.	Summary Report	Microfiche	June 1976	Y
9	Schutze	Evaporation (Lake-Land)			
	1.	Weekly evaporation estimates	Microfiche	June 1976	Y
	2.	Final Report	Microfiche	June 1976	Y
10	DeCooke	Simulation Studies			
	1.	Final Report	Microfiche	June 1976	Y
11	Schutze	Lake Precipitation			
	1.	Monthly precip estimates-US Basin	Microfiche	June 1976	Y
	2.	Final Report	Microfiche	June 1976	Y
13	Embree	Soil Moisture and Snow Hydrology			
	2.	Soil moisture tabulated data (1/Month)	Microfiche	May 1975	YC
	3.	Snow Depth-Water equivalent (1/Month)	Microfiche	May 1975	YC
	4.	Stream flow - discharge	Microfiche	May 1975	YC
	5.	Final Report	Microfiche	May 1975	YC
16	Stoughton	Lake Level Transfer			
	1.	Final Report	Microfiche	Dec 1975	Y
23	Cox	Outflow Term TWB			
	1.	Discharge St. Lawrence River	Mag Tape	At NCC	YC
	2.	Final Report	Microfiche	At NCC	YC
24	Cox	Flow Model			
	1.	Final Report	Microfiche	Dec 1976	Y
30	Wilshaw	Lake Storage Term (Water Levels)			
	2.	5-minute water levels	Mag Tape	At NCC	YC
	4.	Edited (Converted to common datum)hourly water levels	Mag Tape	At NCC	YC
	5.	Final Report	Microfiche	Nov 1975	YC
31	Schutze	Soil Moisture			
	1.	Weekly soil moisture data	Microfiche	June 1976	Y
	2.	Final Report	Microfiche	June 1976	Y
39	Peck	Airborne Snow Reconnaissance			
	2.	Ground truth data	Microfiche	At NCC	YC
	3.	Airborne survey water equivalent	Microfiche	At NCC	YC

Table 8.--Summary of data available from final IFYGL Archive: United States (continued)

TASK NO	INVESTIGATOR		DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL		TERRESTRIAL WATER BALANCE (Con'd)			
39	Peck		Airborne Snow Reconnaissance (Con'd)			
		4.	Soil moisture measurements	Microfiche	At NCC	YC
		5.	Snow cover water equivalents	Microfiche	At NCC	YC
		6.	Water equivalent - air survey	Microfiche	At NCC	YC
		7.	Final Report (Task Summary)	Microfiche	May 1975	YC
45	Polcyn		Remote Sensing - Terrain			
		6.	Final Report	Microfiche	July 1975	YC
		7.	Aircraft flight data record	Microfiche	At NCC	Y
48	Quinn		Island - Land Precipitation			
		2.	Hourly precipitation amounts	Mag Tape	At NCC	YC
		3.	Precipitation - 80 NWS stations	Mag Tape	At NCC	YC
		4.	Daily Lake Ontario Basin precipitation	Microfiche	At NCC	YC
		5.	Final Report	Microfiche	May 1975	YC
51	Quinn		Evaporation Synthesis			
		1.	Final Report	Microfiche	June 1977	Y
52	Rhodehamel		Groundwater Wells			
		3.	Summary (chronological list)	Microfiche	May 1975	YC
		4.	Final Report	Microfiche	June 1975	YC
58	Schultz		Runoff			
		1.	Tributary stage levels - strip charts (4 USGS gages)	Microfilm	At NCC	YC
		2.	Tributary stage levels observations 15 minute-digital USGS gages	Mag Tape		YC
		4.	Tributary stage levels	Pun'd Cards	At NCC	YC
		5.	Mean weekly flow	Microfiche	At NCC	YC
		6.	Tributary stage & discharge, 35 miscellaneous sites-intermittent	Microfiche	At NCC	YC
		7.	N.Y. State Barge Canal data	Microfiche	At NCC	YC
		8.	Final Report	Microfiche	June 1975	YC
69	Wilson		Radar and Precipitation Gage Network			
		3.	Photographs of radar scope	Microfilm	At NCC	Y
		4.	Daily total precipitation amounts including precipitation gage data	Mag Tape	June 1975	YC
		10.	Precipitation data - Rochester Network	Mag Tape	At NCC	YC
		11.	Precipitation data - Oswego Snow Network	Microfiche	At NCC	YC
		12.	Radar data hourly precipitation amounts (by storm)	Mag Tape	May 1976	YC
		13.	Avg. Dly. Prec. over Eastern Half of Lake	Microfiche	At NCC	Y
		14.	Collection and analyses of digitized radar data	Microfiche	At NCC	Y
		15.	Final Report	Microfiche	May 1976	Y
70	Wiesnet		Aerial Hydrological Survey			
		7.	Final Report	Microfiche	April 1975	YC

Table 8.--Summary of data available from final IFYGL Archive: United States (continued)

TASK NO	INVESTIGATOR		DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL		TERRESTRIAL WATER BALANCE (Con'd)			
74	Sykes		Snow Observation Network			
		1.	Documentation	Microfiche	June 1975	Y
		2.	Rain Gage Charts - 13 Locations	Microfilm	At NCC	Y
		6.	Final Report I. Oswego Weather Radar Project 1972/1973	Microfiche	At NCC	Y
		7.	Final Report II. Precipitation Gages plus Snowfall	Microfiche	At NCC	Y
		8.	Final Report III. Supplemental Study 1973/1974	Microfiche	At NCC	Y
	PANEL		WATER MOVEMENT			
27	Liu		Waverider Buoy			
		3.	Digitized wave data (3 samples/second)	Mag Tape	At NCC	Y
		5.	Hourly summary and plot of digitized wave data	Microfilm	At NCC	YC
		6.	Final Report	Microfiche	July 1975	YC
34	Mortimer		Internal Waves - Temperature Transect			
		1.	Water temperature/depth MBT	Microfilm	May 1975	YC
		5.	Temperature Transects	Microfilm	August 1975	YC
		6.	Final Report	Microfiche	August 1975	YC
37	Pandolfo		Simulation Studies			
		1.	Final Report - Vol. I	Microfiche	At NCC	Y
		2.	FORTRAN Program - Vol. II	Microfiche	At NCC	Y
		3.	One-Dimensional Model - Vol. III	Microfiche	At NCC	Y
		4.	Three-Dimensional Model - Vol. IV	Microfiche	At NCC	Y
49	Rao		Lake Circulation			
		1.	Final Report	Microfiche	June 1976	Y
55	Saylor		Lagrangian Current Observations			
		1.	Current drogue - Daily plot	Microfilm	May 1975	YC
		2.	Water temperature - Daily chart	Microfiche	May 1975	YC
		3.	Water temperature - EBT X-Y plot	Microfilm	May 1975	YC
		4.	Water temperature - Reversing thermometer	Microfiche	May 1975	YC
		5.	Final Report	Microfiche	May 1975	YC
56	Saylor		Circulation - Currents			
		1.	Final edited current data	Mag Tape	May 1975	YC
		3.	Final Report	Microfiche	Sept 1975	YC
59	Scott		Coastal Chain			
		1.	Current Meter Data, Water Temperature	Mag Tape	At NCC	YC
		2.	Final and Basic Data Report	Microfiche	At NCC	YC
77	Pickett		Physical Lake Properties			
		1.	Current, temperature analysis	Microfiche	Dec 1976	Y
		2.	Final Report	Microfiche	Dec 1976	Y
	PANEL		MAJOR SYSTEMS			
50	Rasmusson		Atmospheric Water Balance			
		1.	Heat and Water Budget Computations	Microfiche	June 1976	Y
		2.	Final Report	Microfiche	June 1976	Y
100	CEDDA		Physical Data Collection System			
		2.	Provisional Meteorological and Limnological data (6 Minute)	Mag Tape	At NCC	YC
		3.	-Data Listing	Microfilm	At NCC	YC
		4.	-Time Series Graphics	Microfilm	At NCC	YC

Table 8.--Summary of data available from final IFYGL Archive: United States (continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	MAJOR SYSTEMS (Con'd)			
100	CEDDA	Physical Data Collection System (Con'd)			
	5.	Final Meteorological & Limnological Data (6 Minute)	Mag Tape	AT NCC	YC
	6.	Data Listing of 6 Minute Observations and Hourly Averages	Microfilm	AT NCC	YC
	7.	-Time Series Graphics (6 Minute)	Microfilm	At NCC	YC
	8.	-Hourly Average tapes	Mag Tape	At NCC	YC
	9.	Station event logs and histories	Microfilm	At NCC	Y
	10.	System documentation	Microfiche	Dec 1975	YC
	11.	Calibration data	Microfilm	At NCC	Y
	18.	Met. Data - CDN and US Buoys	Mag Tape	At NCC	Y
101	CEDDA	US IFYGL Ship System-RESEARCHER			
	3.	1 Second data - (1/10 Second, Subsurface)	Mag Tape	At NCC	Y
	4.	EBT On-station data, 6-minute total radiation, Decibar average Subsurface data, 6-minute average data	Mag Tape	At NCC	YC
	7.	Radiation data and 6 minute averages- -Time Series Graphics	Microfilm	June 1975	YC
	9.	Manual observations - Edited	Mag Tape	At NCC	YC
	11.	9-Point digitized EBT	Mag Tape	At NCC	Y
	12.	EBT X,Y traces	Microfilm	At NCC	Y
	13.	Time Series Graphics, 1-second data	Microfilm	May 1975	Y
	14.	EBT Graphics	Microfilm	June 1975	Y
	16.	RESEARCHER Dissolved oxygen traces	Microfilm	At NCC	Y
	17.	Barograph charts	Microfiche	At NCC	Y
	18.	Processing documentation	Microfiche	Dec 1975	Y
	19.	XBT data	Microfilm	At NCC	Y
	20.	XBT data - digitized at NODC	Mag Tape	At NCC	YC
102	CEDDA	US IFYGL Ship System-ADVANCE II			
	3.	1 Second data - (1/10 Second, Subsurface)	Mag Tape	At NCC	Y
	4.	EBT On-station data, 6 minute total radiation, Decibar average Subsurface) data, 6-minute average data	Mag Tape	At NCC	YC
	7.	Radiation data and 6 minute averages - -Time Series Graphics	Microfilm	June 1975	YC
	9.	Manual observations - Edited	Mag Tape	At NCC	YC
	11.	9-Point digitized EBT	Mag Tape	AT NCC	Y
	12.	EBT X,Y traces	Microfilm	At NCC	Y
	13.	Time Series Graphics, 1-second data	Microfilm	May 1975	Y
	14.	EBT Graphics	Microfilm	June 1975	Y
	16.	Processing documentation	Microfiche	Dec 1975	Y
103	CEDDA	Rawinsonde			
	4.	Raw Data Time Series Plots	Microfilm	At NCC	Y
	5.	Final data - 5 Second Averages	Mag Tape	At NCC	Y
	6.	Final data - 10 Millibar Increments	Mag Tape	At NCC	YC
	7.	Final data-50 Millibar Increments	Mag Tape	At NCC	YC
	8.	Adiabatic charts and listings	Microfilm	At NCC	YC
	10.	Processing document	Microfiche	Dec 1975	YC
	13.	Documentation and basic information	Microfilm	At NCC	Y
110	EPA	STORET Data			
	3.	Final data - Microfiche	Microfiche	July 1975	Y
	5.	Final data - Tape	Mag Tape	July 1975	Y

Table 9.--Summary of data available from final IFYGL Archive: Canada

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	ATMOSPHERIC BOUNDARY LAYER			
5	Donelan	Direct Measurement of Energy Fluxes			
	1.	Niagara Bar Micromet data - 10 Min.	Mag Tape	At NCC	Y
	2.	30-Min Ave. radiation & water level	Microfilm	At NCC	Y
	3.	30-Min Ave. friction & flux data	Microfilm	Sept 1975	Y
15	McBean	Space Spectra in the Free Atmosphere			
	1.	Mesoscale low-level flight data	Mag Tape	At NCC	Y
	2.	Mesoscale low-level flight data	Microfiche	At NCC	Y
28	McBean	Momentum, Heat, & Moisture Transfer			
	1.	Niagara Bar Micromet data	Microfiche	At NCC	Y
44	Elder	Analysis of Energy Fluxes			
	2.	Preliminary estimates	Microfiche	At NCC	Y
	3.	Final estimates	Microfiche	July 1975	Y
	4.	Preliminary investigation of wind stress field over Lake Ontario	Microfiche	At NCC	Y
75	Smith	Wind & Temperature Fluctuations			
	1.	Niagara Bar preliminary data	Microfiche	At NCC	Y
	2.	Niagara Bar final data	Microfiche	At NCC	Y
	3.	Bedford Buoy #1 data	Microfiche	At NCC	Y
97	Elder	Meteorological Buoy Measurements			
	1.	10-min observational data & 1 hour averaged data	Mag Tape	At NCC	Y
	2.	Prelim Invest-Wind Stress Field	Microfiche	At NCC	Y
	3.	Field Report	Microfiche	At NCC	Y
	4.	Summary of Met. Buoy & Manual Measurements	Microfiche	At NCC	Y
	5.	A Met. Buoy System for Great Lakes Studies	Microfiche	At NCC	Y
	6.	Listings	Microfilm	At NCC	Y
107	Shaw	Air Pollution Sinks			
	1.	Sulphate deposition by precipitation	Microfiche	At NCC	Y
	PANEL	BIOLOGY - CHEMISTRY			
54	Gorman	Groundwater Supply Near Kingston			
	1.	Geochemical Study of Deadman Bay	Microfiche	At NCC	Y
81	Salbach	Material Balance Lake Ontario			
	1.	Water quality info-preliminary	Microfiche	At NCC	Y
	2.	Water quality data - tributary streams	Microfiche	At NCC	Y
82	Watson	Lake Ontario Zooplankton Migration			
	1.	Energetics of Vert. Migration	Microfiche	At NCC	Y
	2.	Distribution data	Mag Tape	Dec 1975	Y
	3.	Field Nutrient Excretion	Microfiche	Dec 1975	Y
83	Christie	Cooperative Studies of Fish Stocks			
	1.	Times, locations of trawl drags	Microfiche	At NCC	Y
	2.	Effects on the Salmonid Community	Microfiche	At NCC	Y
	3.	Changes in Fish Species Composition	Microfiche	At NCC	Y
84	Owen	Cladophora Growth			
	1.	Location and Extent of Cladophora	Microfiche	June 1975	Y

Table 9.--Summary of data available from final IFYGL Archive: Canada (continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	BIOLOGY - CHEMISTRY (Con'd)			
85	Frazer	Nutrient Cycles, Lake Ontario			
	1.	Phosphorus & Nitrogen Transect	Microfiche	At NCC	Y
86	Nicholson	Lake Ontario Surface Plankton Survey			
	1.	Pigment Analysis:Chlorophyll "A"	Microfiche	At NCC	Y
98	Carpenter	Lake Ontario Cross-Section Study			
	1.	Distribution of Zooplankton	Microfilm	June 1975	Y
	2.	Phytoplankton data	Microfilm	June 1975	Y
101	Munawar	Lake Ontario Primary Production Study			
	1.	Measurement and Prediction	Microfiche	At NCC	Y
	2.	Primary production at an Inshore & Offshore Station	Microfiche	At NCC	Y
	3.	Final Report-Biomass Parameters and Primary Production	Microfiche	July 1975	Y
102	Glooschenko	Lake Ontario Diel Pigment Variation			
	1.	Diel Chlorophyll "A" Variations	Microfiche	At NCC	Y
103	Gilbertson	Pesticide Concentration in Birds' Eggs			
	1.	Seasonal Changes, Terns, Hamilton	Microfiche	At NCC	Y
104	Shiomi	Rain Quality Monitoring			
	1.	Composition of Precipitation	Microfiche	Dec 1975	Y
	PANEL	ENERGY BALANCE			
8	Robertson	Shore Gauging Stations			
	1.	Hourly averaged water temperature	Mag Tape	At NCC	Y
	2.	Key Punch Card Documentation	Report	At NCC	T
	3.	Documentation of System	Microfiche	Sept 1975	Y
32	Rodgers	Thermal Bar Study			
	1.	Energy Budget Study	Microfiche	At NCC	Y
42	Boyce	Heat Storage of Lake Ontario			
	1.	Heat Content Survey Report #1	Microfiche	At NCC	Y
	2.	Heat Content Survey Report #2	Microfiche	At NCC	Y
	3.	Heat Content Survey Report #3	Microfiche	At NCC	Y
	4.	Heat Content Survey Report #4	Microfiche	At NCC	Y
	5.	Heat Content Survey Report #5	Microfiche	At NCC	Y
	6.	Heat Content Survey Report #6	Microfiche	At NCC	Y
	7.	Heat Content Survey Report #7	Microfiche	At NCC	Y
	8.	Heat Content Survey Report #8	Microfiche	At NCC	Y
	9.	Heat Content Survey Report #9	Microfiche	At NCC	Y
	10.	Heat Content Survey Report #10	Microfiche	At NCC	Y
	11.	Final Report	Microfiche	June 1975	Y
71	Latimer	Canadian Radiation Network			
	1.	AES radiation data	Microfilm	Not Known	Y
	2.	Deleted			
	3.	Documentation	Microfiche	At NCC	Y
72	Ramseier	Floating Ice Research			
	1.	Navigation Season Extension Studies	Microfiche	At NCC	Y
	2.	Studies, Extension of Winter Nav.	Microfiche	At NCC	Y

Table 9.--Summary of data available from final IFYGL Archive: Canada (continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	ENERGY BALANCE (Con'd)			
73	Judge	Terrestrial Heat Flow			
	1.	Analysis of Heat Data	Microfiche	At NCC	Y
	2.	Mud Temperature Gradient	Microfiche	June 1975	Y
	3.	Thermal Conductivity of Lake Ontario	Microfiche	June 1975	Y
	4.	Bottom Water Temperature	70mm Film	June 1975	Y
80	Davies	Radiation Balance Program			
	1.	Radiation data	Mag Tape	At NCC	Y
	3.	Final Report, Canadian Radiation	Microfiche	At NCC	Y
87	Boyce	Heat Flow to Lake Ontario Included in Task 42 EB			
	PANEL	FIELD SUPPORT			
1	Thomson	Remote Sensing			
	1.	Lake Dynamics Utilizing Sun-Glint	Microfiche	At NCC	Y
	2.	High Altitude Remote Sensing	Microfiche	At NCC	Y
30	Rodgers	IFYGL Operations - CCGS PORTE DAUPHINE			
	1.	Digitized Shipboard Data - EBT	Mag Tape	At NCC	Y
		A. Conductivity of Surface Water			Y
		B. Chlorophyll samples			Y
		C. Hourly weather data			Y
		D. Radiation data			Y
	6.	Shipboard data	Microfilm	At NCC	Y
68	CCIW	CCIW Supporting Resources			
	1.	Shipboard data - STAR Format	Mag Tape	At NCC	Y
	2.	Description of STAR System	Microfiche	.	Y
	3.	TSAR Format Documentation	Paper	At NCC	T
	4.	Shipboard EBT data	Mag Tape	At NCC	Y
	6.	Shipboard data	Microfilm	At NCC	Y
79	McCulloch	Bathymetric Surveys - Lake Ontario			
	1.	Lake Ontario Bathymetric data	Mag Tape	At NCC	Y
94	MacPhail	Data Retransmission by Satellites			
	1.	Data retransmission	Microfiche	At NCC	Y
118	CCIW	Publications			
	1.	Plan of Study for IFYGL	Microfiche	At NCC	Y
	2.	Objective Analysis Surface Pressure	Microfiche	At NCC	Y
	3.	Numerical Models of Airflow	Microfiche	At NCC	Y
	4.	1971 Buoy Intercomparison	Microfiche	At NCC	Y
	5.	Canadian Projects & Supplements 1-4	Microfiche	At NCC	Y
	6.	Canadian IFYGL Data Submissions 7/31/74	Microfiche	At NCC	Y
	7.	Intercomparison - Research Aircraft	Microfiche	At NCC	Y
	8.	Hydrometeorological Studies	Microfiche	AT NCC	Y
	9.	The IFYGL Field Year	Microfiche	At NCC	Y

Table 9.--Summary of data available from final IFYGL Archive: Canada (continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	FIELD SUPPORT (Con'd)			
250	IFYGL	Weather Summaries			
	1.	IFYGL "WEATHER DATA" Monthly	Microfiche	At NCC	Y
	PANEL	LAKE METEOROLOGY & EVAPORATION			
16	Irbe	Airborne Radiation Thermometer Surveys			
	1.	Airborne Radiation Thermometer maps	Microfiche	At NCC	Y
18	McCulloch	Climatological Network			
	1.	Monthly record Canadian Met. data	Report	At NCC	T
	2.	1972 Ship data - all Lakes	Mag Tape	At NCC	Y
	3.	Island Precipitation data	Microfiche	Sept 1975	Y
	4.	Hourly Weather data	Mag Tape	At NCC	Y
20	McCulloch	Bedford Tower Program			
	1.	Bedford Tower Met. data	Mag Tape	Dec 1975	Y
21	McCulloch	Canadian Shoreline Network			
	1.	Met. data: Shoreline Stations	Mag Tape	At NCC	Y
22	McCulloch	Synoptic Studies			
	1.	Synoptic Studies Analysis	Microfiche	June 1976	Y
23	Pollock	Precipitation in Canada			
	1.	Daily gridpoint values of prec.	Mag Tape	At NCC	Y
	2.	Distrometer & rain gauge data	Mag Tape	At NCC	Y
24	Phillips	Climatological Studies			
	1.	IFYGL Weather Highlights	Microfiche	At NCC	Y
	2.	Surface Weather Maps	Microfiche	At NCC	Y
25	Irbe	Lake Ontario Evaporation by Mass Transfer			
	1.	Monthly estimates	Microfiche	At NCC	Y
27	McCulloch	Island Precipitation Network			
	1.	Supplementary Precipitation data	Microfiche	At NCC	Y
64	Ferguson	Basin Evapotranspiration			
	1.	Monthly maps of Evapotranspiration	Microfiche	Dec 1975	Y
65	McCulloch	Evaporation Pan Network			
	1.	Evaporation Pan Documentation	Microfiche	At NCC	Y
66	Ferguson	Atmospheric Water Balance			
	1.	Atmospheric Water Balance	Microfiche	At NCC	Y
67	Webb	Atmospheric Water Balance			
	1.	Mean Monthly Temperatures	Microfiche	At NCC	Y
117	McCulloch	APT Photographs			
	1.	ESSA 8 APT photographs	Microfilm	At NCC	Y

Table 9.--Summary of data available from final IFYGL Archive: Canada (continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAIL-ABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	TERRESTRIAL WATER BALANCE			
11	Witherspoon	Monthly Water Balance-Lake Ontario Basin			
	1.	Hydrologic Model of the Basin	Microfiche	June 1975	Y
	2.	Storage in the Water Balance	Microfiche	June 1975	Y
12	Witherspoon	Monthly Water Balance of Lake Ontario			
	1.	Water Levels	Microfiche	.	Y
	2.	Outflow	Microfiche	.	Y
	3.	Inflow	Microfiche	.	Y
	4.	Runoff	Microfiche	.	Y
	5.	Precipitation	Microfiche	.	Y
	6.	Evaporation	Microfiche	.	Y
	7.	An Estimate of Water Balance	Microfiche	At NCC	Y
	8.	Preliminary Water Balance	Microfiche	.	Y
13	Ryckborst	Groundwater Flow Into Lake Ontario			
	1.	Groundwater Flow Simcoe & Ontario	Microfiche	At NCC	Y
	2.	Groundwater Inflow Canadian Side	Microfiche	At NCC	Y
	3.	Linear Synthetic Hydrographs	Microfiche	.	Y
14	Russell	Hydrology of Lake Ontario			
	1.	Tributary data	Microfiche	At NCC	Y
	2.	Daily discharge	Mag Tape	At NCC	Y
38	Ostry	Groundwater Contribution			
	1.	Observation wells	Microfiche	At NCC	Y
	2.	Snow courses	Microfiche	Sept 1975	Y
	3.	Soil moisture	Microfiche	Sept 1975	Y
	4.	Overburden well yields	Microfiche	At NCC	Y
	5.	Hydrology of Forty Mile Creek	Microfiche	At NCC	Y
	6.	Bedrock well yields	Microfiche	At NCC	Y
	7.	Groundwater chemistry-Forty Mile Creek	Microfiche	At NCC	Y
	8.	Surficial geology,N. Shore-Newcastle	Microfiche	At NCC	Y
	9.	Hydrogeology-Bowmanville,Newcastle	Microfiche	At NCC	Y
46	MacDonald	St. Lawrence-Niagara Riv.Measuring Prog.			
	1.	Inflow measurements	Microfiche	At NCC	Y
49	Adams	Snow Stratigraphy and Distribution			
	1.	Peterborough Area: Met. data	Microfiche	Dec 1975	Y
	7.	Peterborough Area: Snow data	Microfiche	At NCC	Y
69	Henderson	Pleistocene Mapping			
	1.	Maps and charts	Microfiche	June 1976	Y
74	Dohler	Water Level Network			
	1.	Port Weller	Mag Tape	At NCC	Y
	2.	Toronto	Mag Tape	At NCC	Y
	3.	Burlington	Mag Tape	At NCC	Y
	4.	Cobourg	Mag Tape	At NCC	Y
	5.	Point Petre	Mag Tape	At NCC	Y
	6.	Kingston	Mag Tape	At NCC	Y
	7.	Format Hrly Header & Monthly Cards	Paper	At NCC	Y
	8.	Water levels	Mag Tape	At NCC	Y

Table 9.--Summary of data available from final IFYGL Archive: Canada (continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	TERRESTRIAL WATER BALANCE (Con'd)			
116	Loijens	Airborne Gamma-Ray Snow Survey			
	1.	Snow-Water Equivalent	Microfiche	At NCC	Y
	2.	Experimental Snow Survey	Microfiche	At NCC	Y
	3.	Comparison of Water Equivalent	Microfiche	At NCC	Y
	PANEL	WATER MOVEMENT			
34	Rodgers	Circulation Near Toronto			
	1.	Tower current speed & direction water temperature	Mag Tape	May 1975	Y
40	Csanady	Coastal Chain Study			
	1.	Provisional Reports	Microfiche	At NCC	Y
	2.	Final Report	Microfiche	At NCC	Y
	3.	Deleted			
	4.	Daily Summary Presquile	Pun'd Cards	At NCC	T
	5.	Daily Summary: Oshawa	Pun'd Cards	At NCC	T
	6.	Daily Summary: Presquile & Oshawa	Mag Tape	At NCC	Y
	7.	Baroclinic Coastal Jets	Microfiche	At NCC	Y
43	Boyce	Internal Wave Measurements			
	1.	Transect cross section	Microfiche	Sept 1975	Y
	2.	Fixed Temperature Profiler (FTP) data	Not Known	Sept 1975	Y
	3.	Transect tape	Mag Tape	Sept 1975	Y
	4.	FTP data file	Mag Tape	Sept 1975	Y
	5.	Transect tapes	Mag Tape	Sept 1975	Y
45	Bennett	Lake Current Measurements			
	2.	10 minute current temperature data	Mag Tape	At NCC	Y
	3.	Final Report	Microfiche	Dec 1976	Y
	4.	10 minute current data listing	Microfilm	At NCC	Y
70	Falconer	Ground Truth for Remote Sensing			
	1.	Analysis of ERTS and Aircraft data	Microfiche	Sept 1975	Y
76	Holland	Surface Wave Studies			
	1.	Final Report - Wave Climate Study	Microfiche	Oct 1975	Y
	2.	Wave Climate Data - Cobourg	Mag Tape	At NCC	Y
	3.	Deleted			
	4.	Wave Climate Data-Main Duck Island	Mag Tape	At NCC	Y
	5.	Equiv. Wave Heights vs. Period, 3 Stns.	Microfiche	At NCC	Y
	6.	Deleted			
	7.	Deleted			
	8.	Wave Climate Data - Toronto	Mag Tape	At NCC	Y
	9.	Deleted			
	10.	Format for Wave Climate Study	Microfiche	At NCC	Y
89	Murthy	Turbulent Diffusion Studies			
	1.	Large Scale Diffusion Studies	Microfiche	At NCC	Y
	2.	Nearshore Diffusion Studies	Microfiche	At NCC	Y
	3.	Lagrangian and Current Measurements	Microfiche	At NCC	Y

Table 9.--Summary of data available from final IFYGL Archive: Canada (continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
	PANEL	WATER MOVEMENT (Con'd)			
89	Murthy	Turbulent Diffusion Studies (Con'd)			
	4.	Diffusion in Thermocline & Hypolimnion regions	Microfiche	At NCC	Y
	5.	Dispersion of Floatables	Microfiche	At NCC	Y
	6.	Observations of Lateral Shear	Microfiche	.	Y
95	Simons	Hydrodynamical Modelling			
	1.	Deleted			
	2.	Deleted			
	3.	Deleted			
	4.	Deleted			
	5.	Deleted			
	6.	First Report: Model Study of Agnes	Microfiche	At NCC	Y
	7.	Model Study of Betty Storm	Microfiche	At NCC	Y
	8.	Development of Numerical Models	Microfiche	At NCC	Y
	9.	Development of Numerical Models Part 2	Microfiche	At NCC	Y
	10.	3 Dimensional Models	Microfiche	At NCC	Y
	11.	Obs & Computed Current-Hurricane Agnes	Microfiche	At NCC	Y
	12.	Hydrodynamical Modelling Studies	Microfiche	At NCC	Y
	13.	Verification of Numerical Models Part 1	Microfiche	At NCC	Y
109	Rodgers	Upwelling Study			
	1.	Water Temp. (EBT): Included in Task 30	Pun'd Cards	At NCC	T
110	Arajs	Hydro Intake Study			
	1.	Water current & Temp: Chub Point, Bowmanville, Weoleyville, Pickering & Lennox	Mag Tape	At NCC	Y
111	Palmer	Lakeview Dispersion Study			
	1.	Current Meter Data - Lakeview	Mag Tape	At NCC	Y
	2.	Current Meter Data - Lorne Park	Mag Tape	At NCC	Y
115	Cho	Wave Climatology			
		Manual Records at CCIW			